U.S.G. TECHNICAL LIBRARY add-ins

Your Technical Library is brought completely up to date with the insertion and cross-reference of this supplement. Insert it after the Monthly Supplement divider and discard the previous issue; mark the cross-references in your binder's technical folders *now!*

This is a summary of your latest selling tools: use it to good advantage but guard it carefully — the information is also valuable to your competitors. The descriptive literature listed generally is available on Advertising Requisition.

This issue is cumulative—discard previous month's "Add-Ins". **May-June '77**

GYPSUM PANEL SYSTEMS

new The Definitive Directory—Gypsum Panel/Sheathing Catalog

references: SA-927, SA-928.

descriptive literature: WB-1501 (H.A. Gould letter 4/12/77).

Colorful WB-1501 is the dealer/contractor guide to U.S.G. gypsum panels and sheathing: SHEETROCK Gypsum Panels, TEXTONE Vinyl-Faced Gypsum Panels, USG Exterior Gypsum Ceiling Board and USG Gypsum Sheathing. It describes bundling tape colors and edge designs; gives product types and technical data, weights and availability.

new Revised Data Sheet, New Stuffer Promote Foil-Backed Gypsum Panels

references: SA-927.

descriptive literature: WB-1405, WB-1502 (H.A. Gould letter 4/18/77).

Data sheet #2 on Foil-Backed SHEETROCK Gypsum Panels includes new weight limitations on all types of gypsum panel ceilings.

Six-page stuffer WB-1502 is designed to promote the same energy-saving benefits to trade factors as are detailed in WB-1405.

new Gypsum Panel Data Sheets #1 and #3 Revised

references: SA-927.

descriptive literature: WB-1152, WB-1473 (Division Release).

Data sheets #1 and #3, on SHEETROCK Regular and FIRECODE Gypsum Panels and on USG Exterior Gypsum Ceiling Board, respectively, are revised to show ceiling insulation weight limitations.

Revised Data Sheet on USG Gypsum Sheathing Reflects Approvals

references: SA-927.

descriptive literature: GS-102 (Division Release).

Data Sheet GS-102 on USG Gypsum Sheathing now follows the series format as No. 6, updates the content with ICBO, BOCA and SBCC code approvals and qualification for HUD racking resistance requirements.

Mailer Covers the Latest on Edge Tape Color-Coding

references: SA-917, SA-927.

descriptive literature: WB-1496 (Division Release).

New 5-1/2"x8" mailer promotes redesigned color-coded edge tapes, used on all types of SHEETROCK Gypsum Panel, IMPERIAL Gypsum Base and USG Gypsum Sheathing bundles, for quicker identification and easier inventory control. Mailer opens out to show twelve tape designs in life-size and full color. Sizzle sells the steak!

Phase II, Final Release—TEXTONE Panel Availability

references: SA-928.

descriptive literature: WB-1481 (H.A. Gould letter 12/13/76).

Another hard-working package of 8-1/2"x11" vinyl super swatches and separators, WB-1481 is Phase II—the latest release of new TEXTONE Vinyl-Faced Gypsum Panel line availability: Linens and Textiles in six colors each (four Standard and two Custom) plus four standard Woodgrains, all for insertion in Decorator Book WB-1408. See also Phase I item, July-August or later '76 Add-Ins, or J.J. Kelly release letter 5/24/76.

Like WB-1480 in Phase I, WB-1481 was mailed direct to customers—about year-end—and also contains postpaid reply cards (WB-1331) for ordering sales aids, and TEXTONE Topics (WB-1466). It is available in limited quantities, on allocated basis, for "mail-missed" customers via standard Ad Requisition. So is TEXTONE Swatch Sample WB-1495 (formerly WB-1474 in Phase I).

DEMOUNTABLE PARTITIONS

"How to Cope with Corners," without Coping or Mitering—STL-363 Clip

references: SA-1020.

descriptive literature: (R.S. Wheeler letter 12/23/76, sketch No. 438).

Letter to contractor outlines use of new dark bronze color Steel Corner Clip STL-363 for simplified handling of STL-362 Steel Ceiling Runner at ULTRAWALL Partition corners, without coping or mitering. Stocked 25 per box in Atlanta, at $10.50.

JOINT TREATMENT

new In Bright New Dress: COVER COAT Drywall Compound Data Sheet

references: SA-927.

descriptive literature: J-59 (Division Release).

Data sheet J-59 uncovers a bright new format in this February revision, and the many advantages of finishing concrete with COVER COAT Drywall Compound.

Copyright 1977, United States Gypsum Company

new Other Joint Treatment Literature Revisions

references: SA-927.

descriptive literature: J-5, J-75, J-379 (Division Release).

Data Sheet #5, on IMPERIAL QT Texture Finish, now uses generic paint system references in application directions. Previous trade names were a possible source of confusion in the field.

"Do's and don'ts" of drywall finishing in J-75, and PERF-A-TAPE Corner Tool Instruction Sheet J-5 are also updated.

USG Ready-Mixed Joint Compound in "Metriconomy"-sized LAMICOR Fiber Container

references: SA-927.

descriptive literature: J-394 (C.M. Howard letter 3/1/77).

New 6-page, 2-color folder outlines the merits of the versatile new LAMICOR Fiber container for efficient storage and jobsite handling, moisture-resistant protection, easy disposal and 25-kg. economy. The new "hard conversion" metric size is equivalent to 55.1 lbs., 10% more USG Ready-Mixed Joint Compound than the old 50-lb. carton.

new The super-tough, space-saving container is but one element in a hard hitting "degree of difference" promotion kit for increased dealer sales. Kit also includes: 16 crystal digital Celsius/Fahrenheit thermometers to reinforce the metric measure, 50 of the folders, container instructions, revised Marketing Series Bulletins and three packaging-convert promo labels (to appear on conventional pail-packaging). Here's product, packaging, and promotion—first class.

PLASTER SYSTEMS

"It's In the Bag!"—BONDCRETE Lime Mailer Revised

references: SA-917.

descriptive literature: L-56 (H.J. Rowe letter 3/15/77).

Contractor mailer has been revised to delete availability of BONDCRETE Lime mortar-mix calculator, but still supplies quick-calculation formula outline for contractors to figure their savings. Copy builds a convincing case for the benefits of BONDCRETE Lime for mortar or stucco. Solid contractor promotion, direct or distributor.

CONSTRUCTION STEEL COMPONENTS

USG Screw Selector Guide Revised

references: SA-917, SA-927.

descriptive literature: CS-31 (J.C. Edwards letter 1/7/77).

WB-1446 has become CS-31 with the addition of several new screws for specialized attachment—low-profile head for metal-to-metal, pancake and washer heads for metal lath-to-studs, additional lengths with trim heads, and the Acorn slotted HWH Tapcon™ Fastener for steel framing-to-concrete. Table on page 11 matches screw type to application. Selector color is now olive.

USG Steel Joist Brochure Adds Metric Values

references: SA-510, SA-927.

descriptive literature: CS-3 (J.C. Edwards letter 3/11/77).

Metric equivalents added to dimensions and tables; everything else is the same.

New Data Sheet Combines No. 800 Corner Bead and Metal Trim

references: SA-917, SA-927.

descriptive literature: CS-29 (J.C. Edwards letter 1/7/77).

Product is the same, but new CS-29 gets mileage from No. 800's advantage of stretching joint compound, which CS-10—now discontinued—did not. Also covered in CS-29 is USG No. 801 Metal Trim, A and B, not previously shown in "CS" Series Data Sheets.

BUILDING INSULATION

Promotion of THERMAFIBER Products Spotlights Heavy Space Schedule

references: SA-705, SA-707.

descriptive literature: (J.T. Potterton letter 1/3/77).

Letter outlines 1977 space schedule of seven inserts in six trade journals to spearhead THERMAFIBER product promotion, and redesign of collateral pieces.

THERMAFIBER Safing Rates an "Exclusive" in VA Specs

references: SA-707.

descriptive literature: (J.T. Potterton letter)

The headline gives the score, but the letter fills in the details on nice fielding in Washington.

SOUND CONTROL PRODUCTS

new

New Data Sheet Describes AIRSON Ceilings

references: SA-905.

descriptive literature: SC-504 (C.W. Burgeson letter 3/21/77).

Eight pages of descriptive copy, data, charts, specs, and technical drawings with eye-appeal, outline all the basic characteristics and application of AIRSON Air Distribution Ceilings in ACOUSTONE, AURATONE and AIRFLO Systems. The updated AIRSON Design Manual, for more limited distribution, is scheduled to follow. SC-504 is intended for your personal introduction to trade factors, at *your* discretion; it is not being sent to your customers.

add-ins/3

March-April '77

new

New Info—Earthtone Colors for ACOUSTONE Tile; AURATONE Product Shipping

references: SA-905.

descriptive literature: (C.W. Burgeson letters 3/11 & 3/17/77).

Letter of March 11 gives results of light reflectance tests on Sandstone, Clay Gray, Pumice and Ivory earthtone colors: (percentages, respectively), "F" Fissured—35.5, 40.5, 65.5, 66.5; Glacier—29, 34, 59, 57; Seacrest—33.5 (given only for Clay Gray, assume others as approximately the same as for Glacier).

Letter of March 17 calls attention to minor changes made in new price lists recently distributed on AURATONE products: service on "A" and "B" items; standard status of Nordic and Mecca unperforated patterns; limited color availability, via "special order," minimum 30,000 sq. ft. per color.

ACOUSTONE Space Units—Product, Procedure and Application in Four Pages

references: SA-905.

descriptive literature: SC-823 (C.W. Burgeson letter 3/9/77).

New 4-page Data Sheet SC-823 tells all you could ask, from a discussion of sound build-up, to calculation procedure, including new adhesive attachment. Letter of 3/9/77 fully explains adhesive attachment, which promises lower cost-in-place.

ACOUSTISORBER Noise Control Product Line and Sales Aids Completed

references: SA-905.

descriptive literature: SC-872 (G.E. Hunter letters 12/29/76, 2/15 & 2/26/77).

December letter covers cancellation of Data Sheet SC-811 and the ACOUSTISORBER Space Unit it describes. New Data Sheet SC-872 carries out the series format established by Literature Jacket SC-850 and Data Sheets SC-851, -852 and -853 on ACOUSTISORBER Panels, Screens and Supports (see Nov.-Dec. '76 Add-Ins). SC-872 fully describes the new enlarged—2"x2'x2'—ACOUSTISORBER Space Unit which completes the line, including revised sound absorption data.

Second letter outlines availability of ACOUSTISORBER samples SC-870 (Wall Panel) and SC-871 (Screen), each measuring 2"x1'x2', and SC-809 (Space Unit), measuring 2"x2'x2'. SC-870, at $12, includes one each A-100 and A-200 Clips; SC-871, at $15, has hardboard back and includes one A-300 Tie Clip and one A-400 Hanger Clip; SC-809, at $10, includes two A-200 Wire Hanger Clips. Available from Warren, Ohio, Ad Requisition USG-49. Last letter releases SC-872.

The Numbers Game—Vinyl-Faced Gypsum Panels and G222 Revisited

references: SA-905.

descriptive literature: (C.W. Burgeson letter 2/15/77).

Letter clarifies the various sets of fire hazard classification numbers for USG Gypsum Ceiling Panels with vinyl facing, and the confusion arising from the fact that different types of vinyl/adhesive, and testing at different labs, produced different numbers. It reiterates that UL Design G222 and UL-labeled panels carry only one set, those attained at UL Labs: 40/0/50. See also Nov.-Dec. '76 Add-Ins and/or C.W. Burgeson letter 11/8/76.

valuable information

More Mailers Aim at Small Contractors—with AURATONE/USG Ceiling Panels

references: SA-905.

descriptive literature: SC-865, SC-867 (C.W. Burgeson letter 12/17/76).

Two more 4-color envelope stuffers complete the series of four on sound control products. The other two covered Foil-Backed and Large Module ACOUSTONE Tile and Panels (see Sept.-Oct. or later '76 Add-Ins, or C.W. Burgeson letter 7/12/76). Like SC-854 and SC-856, SC-865 and SC-867 provide a concise 4-page rundown on key features/benefits, along with reply card and imprint space for distributors. SC-865 displays all five AURATONE patterns, SC-867 shows only Lunar pattern as typical of USG Gypsum Ceiling Panels.

Sound Control Product Data Sheets

references: SA-905.

descriptive literature: (see below)

Updated full-color Product Data Sheets to go into contractors' SC-788 binders include the following:

new

SC-504	New 3/77	AIRSON Air Distribution Ceiling Systems
SC-733	Rev. 11/76	Glacier ACOUSTONE Tile and Panels
SC-741	Rev. 12/76	AURATONE FIRECODE Tile
SC-742	Rev. 12/76	AURATONE Panels
SC-743	Rev. 2/77	AURATONE FIRECODE Panels
SC-785	Rev. 11/76	AURATONE Panels/THERMAFIBER Blkts. Ceiling System
SC-818	Rev. 11/76	Seacrest ACOUSTONE Panels
SC-835	Rev. 2/77	VISTA SONIC Panels

ROOF DECKS & FLOOR SYSTEMS

new

More Roof Deck Rating and UL Design Revisions

references: SA-305.

descriptive literature: (D.L. Magnusen letters 3/24 & 4/14/77).

Letter of March 24 describes fire test for Gypsum Roof Deck Foundation at National Gypsum's Buffalo test facility, resulting in a 2-hr. rated poured gypsum deck: 2 in. thick, poured over 2-1/4-in. FIBERGLAS Formboards with beveled edges; special KEYDECK mesh; #000-3-14-3 truss tees at 32-3/4 in. over 6'9" span; hot-rolled purlins, fire-protected. Test superimposed 45-psf live load plus built-up roofing. With 5/8-in. AURATONE Ceiling, it attains "U" of 0.09 for winter, 0.072 for summer.

Letter of April 14 gives revised ratings for UL Design Nos. P207, P213 and P501 with additional insulation, to be reissued under new UL Design numbers (except P207). Revised ratings are 1-hr. restrained and 1-hr. unrestrained, with insulation permitted as follows: P207—4 in. STYROFOAM, P213 and P501—3-1/2 in. FIBERGLAS.

add-ins/4

May-June '77

new

Steel Deck Deflection Study Helps Deflect Price Competition

references: SA-305.

descriptive literature: Special Report reprint (D.L. Magnusen letter 3/15/77).

Letter forwards reprint copy of a Special Report from Roofing/Siding/Insulation magazine, 2/76 and 3/76 issues.

The report resulted from a study, begun by Asphalt Roofing Manufacturers Association, into insulation attachment problems encountered with steel roof decks. This Phase I first concentrates on steel roof deck deflection and span-gauge relationships. Use it—it helps sell gypsum decks!

"Built-Up Roofing" Gets Big Build-Up—in New Format

references: SA-305.

descriptive literature: IR-154 (D.L. Magnusen letter 3/23/77).

Late December '76 revision of IR-154 begins a facelift of the "orange series" folders on roof application, including an innovative cover illustration—a photo of a three-dimensional paper-constructed roof-section. Only content change is to add caution against indiscriminate use of vapor barrier—investigate first!

IRMA Roof Decks Are Looking Up—Side Down, in 1-1/2-Hr. UL Design P229

references: SA-305.

descriptive literature: (D.L. Magnusen letter 1/27/77).

Letter details this new UL Design No. P229, with a 1-1/2-hr. restrained, and a 1-hr. unrestrained, rating, with a "state of the art" U-value of *0.04*. The letter gives guidelines for proper use of this **I**nverted **R**oof **M**embrane **A**ssembly and all materials, including a 4" thickness of Dow Chemical's STYROFOAM RM Roof Insulation, 1/2" SHEETROCK Formboard on 5-6-17-2 truss tees, 2" gypsum concrete, 10J4 bar joists @ 6'0", and a 5/8"x2'x4' AURATONE FIRECODE Panel Ceiling underneath. UL P229 will receive space promotion later in 1977.

Roof Deck UL Designs Expanded; Data Sheet Updated

references: SA-305.

descriptive literature: IR-540 (D.L. Magnusen letter 3/4 & 3/7/77).

UL has expanded its Design No. P676, to include 3" sub-purlin with 1-1/2" insulating formboard for improved thermal resistance, also extend sub-purlin span to 9' with fire rating limited to 1-1/2 hrs.

Data Sheet IR-540 receives update with two new UL Designs, Nos. P229 (described above) and P503. Both are 2" PYROFILL Gypsum Concrete and otherwise similar in components, except that P503 has a 1/2-hr. longer rating, restrained and unrestrained, bar joist spacing at only 4'0", and a ceiling of 5/8" SHEETROCK FIRECODE "C" Gypsum Panels, on USG Metal Furring Channels @ 24". All technical data tables are also updated.

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From the collection of:

United States Gypsum

USG ™

USG Floor Plank Systems

system folder

fire rating	description	test no.	sound rating STC	sound rating IIC	comments
2 hrs.	USG Floor Plank System—¾″ MASTICAL underlayment compd—(1) ⅛″ vinyl flr tile (2) 39-oz carpet & 40-oz pad—2″ USG gypsum flr plank welded to bar joists 48″ o.c.—USG met fur chan 24″ o.c. wire-tied to joists—⅝″ SHEETROCK FIRECODE "C" gypsum panels screw-att 12″ o.c.—joints fin subflr wt 20.5	UL Des G516 (f) (1) BBN-720506 (s) (1) BBN-720507 (s) (2) BBN-720509 (s)	54	37 64	
2 hrs.	USG Floor Plank System—¾″ MASTICAL underlayment compd—2″ USG gypsum flr plank welded to bar joists 48″ o.c.—⅝″ AURATONE FIRECODE ceiling panels on fire-rated exp grid subflr wt 20.5	UL Des G230 (f) (was 293-2 hr) USG-700612 (s)	49		

description

USG Floor Plank Systems are lightweight, fire-resistant assemblies that are laid dry without grout. Metal T&G plank edges are welded to the joists. When finish flooring will be vinyl tile, a ¾″ fill of MASTICAL Underlayment Compound with 1⁄16″ coat of USG Underlayment Topping Compound or ¾″ PYROROCK Sound Underlayment Board with joints flushed is applied over the plank. The surface is suitable for direct application of carpet and pad, ceramic tile (in mortar bed) or wood parquet. A furred drywall or suspended ceiling is installed beneath the joists to complete the assembly.

USG Floor Plank for these systems is a precast metal-edged all-weather structural unit, 2″ thick, 15″ wide, 10 ft. long, weighing 13 psf; the moisture-resistant gypsum core is reinforced with 16-ga. galvanized wire mesh.

MASTICAL, a super-strength gypsum underlayment compound, is mixed with water and sand; sets quickly to provide a durable, non-shrinking floor underlayment without curing. PYROROCK Sound Underlayment Board, a specially formulated square-edge gypsum board, is screw-attached to plank edges for completely dry floor construction. The use of underlayment significantly increases sound attenuation performance; ¼″ plywood or hardboard may also be used as underlayment for tile.

function and utility

These systems, offering dry construction and an immediate working platform, are particularly suited to high-rise or garden apartments, dormitories and light office buildings where bar joists are used in steel frame or load-bearing masonry construction. They may also be used with raised floor systems where pedestals are centered over bar joists and unit load transmitted to plank is less than 220 psi. Pipe and conduits are readily carried in the bar joist space.

Fire Resistance—Noncombustible components provide a 2-hr. fire-resistance rating (see table above).

Sound Control—Above-average resistance to transmission of airborne and impact sound is provided without special underlayment. For maximum sound ratings, the use of underlayment compound or board (above) is recommended.

High Strength—USG Floor Planks support normal apartment floor loads on joist spacings up to 4 ft. o.c. and a 2,000-lb. concentrated load applied over a 2′6″ square area on joists spaced 2′6″. Interlocking T&G edgings of galvanized steel function as built-in "I" beams to produce superior strength and load distribution. Certified full-scale load tests show that effective resistance to lateral loads is provided for wind bracing and seismic design. The assemblies also resist wind uplift forces.

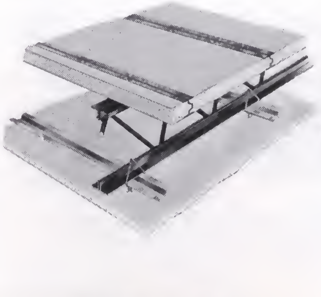
Lightweight—USG Floor Plank weighs 13.0 psf which allows for substantial economy in structural steel. Optional ¾″ PYROROCK Board adds only 3.5 psf and MASTICAL Underlayment 7.5 psf.

Fast Erection—Planks are laid dry; no grouting or curing required. Large T&G edges on plank fit together easily. Planks are quickly welded in place with lightweight short-arc welding equipment.

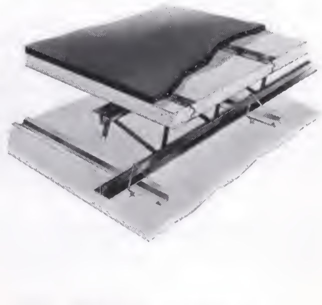
Economy—Simple, fast, all-weather erection; a minimum waste for cutting (less than 2%), and an opportunity for 48″ bar joist spacing result in an economical assembly. Plank ends may occur off supports, greatly simplifying and speeding erection. This same system can be used as the roof decking system providing continuity of construction without involving added trades.

limitations

1. Maximum bar joist spacing: 4 ft. o.c. See table, page 2 for maximum allowable loads.
2. Not recommended for areas subject to sustained excessive humidity conditions.
3. Minimum U.S.G. Underlayment thickness: ¾″.
4. Suitable for use with lightweight drywall or plaster partitions only. Partitions weighing more than 85 lb./lin. ft. may require additional structural support.
5. Recommendations concerning environmental conditions must be adhered to for satisfactory performance (see Specifications, page 4).
6. Where heavy construction equipment, such as masonry buggies, is to be used, floor plank must be effectively protected with temporary planking.
7. A suitable underlayment is required under finished flooring.



USG Floor Plank basic system

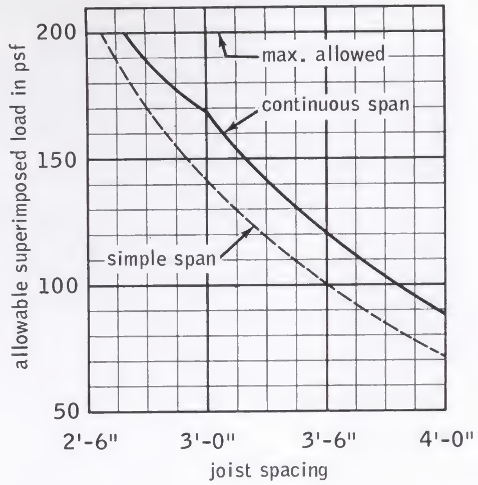


USG Floor Plank with underlayment

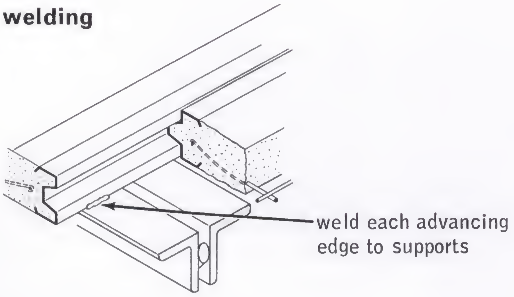
design data/details

design data

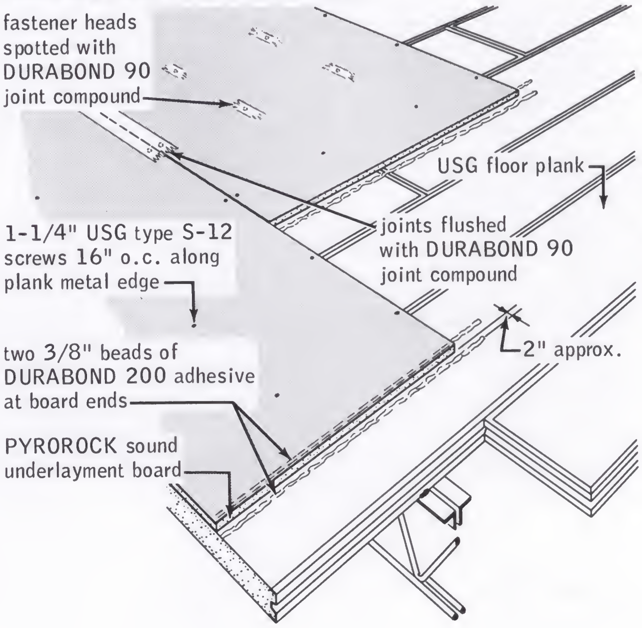
Superimposed Loads—Graph at right indicates the allowable uniformly distributed load that can be superimposed on USG Floor Plank supported on various joist spacings. None of the loads indicated will produce a deflection greater than 1/360 of the span or induce flexural stresses greater than 20,000 psi in the metal edging. Load-carrying capacities are shown for simple and continuous-span conditions.



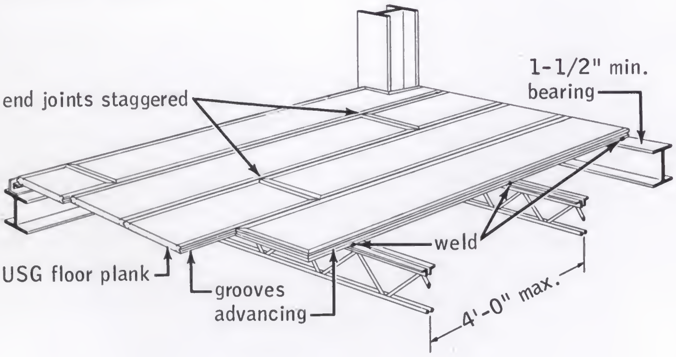
welding



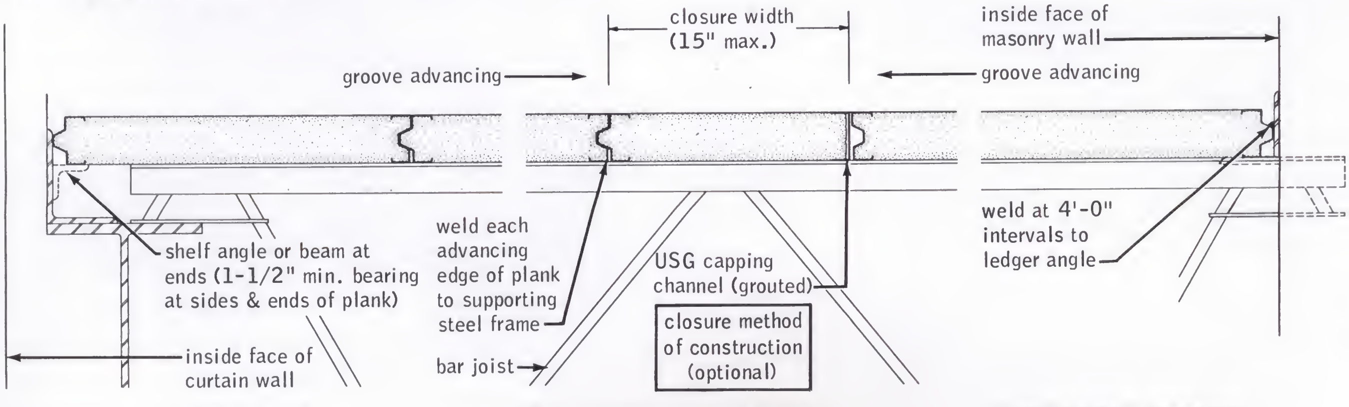
underlayment board application


fastener heads spotted with DURABOND 90 joint compound
USG floor plank
1-1/4" USG type S-12 screws 16" o.c. along plank metal edge
joints flushed with DURABOND 90 joint compound
2" approx.
two 3/8" beads of DURABOND 200 adhesive at board ends
PYROROCK sound underlayment board

subfloor layout



framing at exterior walls


closure width (15" max.)
inside face of masonry wall
groove advancing
groove advancing
weld at 4'-0" intervals to ledger angle
shelf angle or beam at ends (1-1/2" min. bearing at sides & ends of plank)
weld each advancing edge of plank to supporting steel frame
USG capping channel (grouted)
closure method of construction (optional)
bar joist
inside face of curtain wall

curtain wall **floor plank closure detail** **load-bearing masonry**

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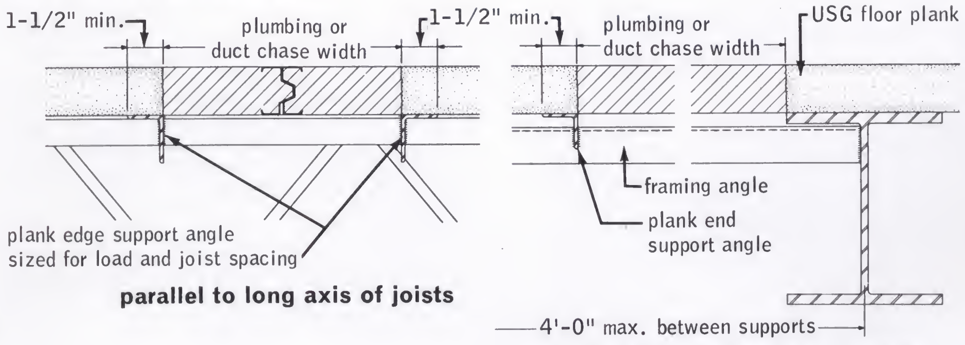
details

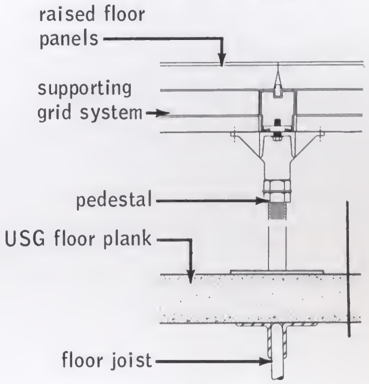
deck framing at openings



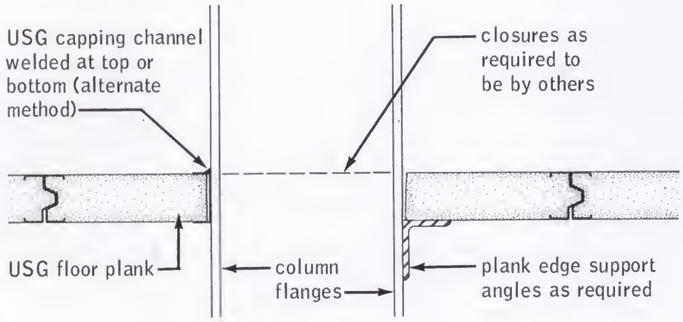
parallel to long axis of joists

transverse to long axis of joists

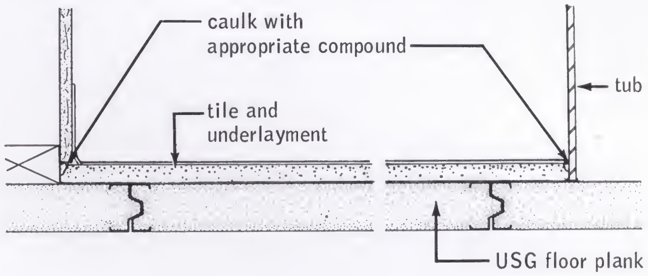
typical raised floor system



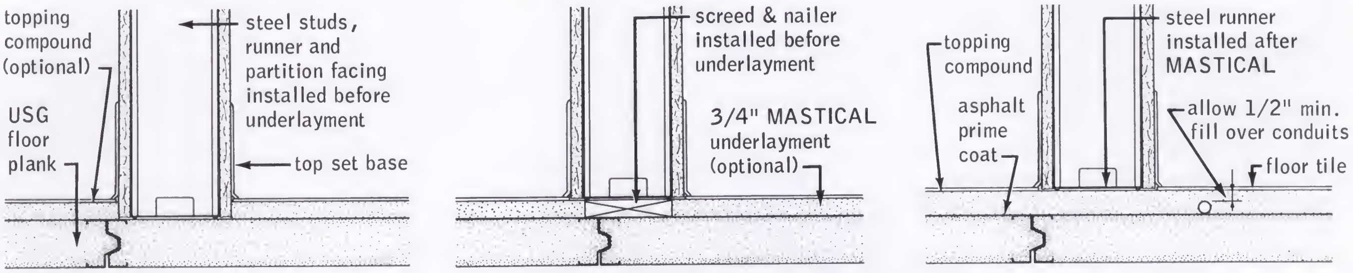
framing at columns



typical bath and laundry room application



metal-stud partition attachments over underlayment compound



specifications

notes to architect

1. *All supports should provide a smooth, level bearing surface, free of burrs, bridging, welds or other irregularities. At floor perimeter and openings, provide 1½" min. continuous bearing or plank support or USG Capping Channel, grouted in place and anchored to framing. At column interruptions where cantilever exceeds 18", install capping channel grouted and anchored to column; otherwise no support is needed.*

2. *For shear transfer from floor to framing, perimeter plank should be welded to the structure 24" o.c. along edges and 15" o.c. at ends.*

3. *Door frame anchors, partition plates and steel runners should be fastened directly to metal edges of floor plank or to ¾"x15"x26-ga. galvanized steel strips screw-attached to metal edges. Secure metal strips and runners with ⅜" USG Brand Type S-12 Screws; 2x4 wood plates with 2¼" USG Brand Type S Screws. Power-driven concrete fasteners are not recommended. Runners should be fastened atop MASTICAL Underlayment Compound with expansion screw anchors or 1¾" square-cut masonry nails; door frame anchors, with expansion screw anchors.*

4. *Holes cut in planks for electrical conduit, plumbing, etc. should be reinforced and filled upon completion of work.*

5. *MASTICAL Underlayment Compound cannot resist stresses caused by sudden thermal changes or other structural movements such as occur when building temperature is raised suddenly. For this reason, building temperature should be stabilized near the normal operating temperature before underlayment application.*

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

SA

309

floor—ceilings

USG Floor Plank Systems

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

a. Installation of USG Floor Plank Systems shall be by a U.S.G.-approved flooring contractor.

b. All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 submittals

Flooring contractor shall submit shop drawings showing plank layout and schedule for stocking various floors.

1.4 delivery and storage of materials

All materials shall be delivered in their original unopened packages or bundles and stocked off the ground in a place providing protection from damage and exposure to the elements. Plank shall be handled and stored on edge. Damaged or deteriorated materials shall be removed from the premises.

1.5 environmental conditions

Building interior shall be enclosed and maintained at a uniform temperature above 55°F. until structure and subfloor temperatures are stabilized, before and during installation of (underlayment compound and topping) (flooring material). (Underlayment compound and topping shall be protected from rapid drying prior to set. After set, continuous heat and ventilation shall be provided to rapidly remove moisture from the area until slab is dry.)

1.6 protection

Temporary wood protection shall be placed over exposed floor plank (and underlayment) subject to concentrated or wheeled loads and heavy foot traffic.

Part 2: products

2.1 materials

- a. USG Floor Plank—2″ thick, 15″ wide, 10′-0″ long with 22-ga. galv. metal edges.
- b. USG Capping Channels—2″, 22-ga., 10′ long.
- c. Mastical Underlayment Compound.
- d. USG Underlayment Topping Compound.
- e. Pyrorock Sound Underlayment Board, square edge, 3/4″ x 48″, (6′) (8′) lengths.
- f. Red Top Wood Fiber Plaster (for repairs and grouting USG Capping Channels).
- g. Sand—ASTM C33 (obtain locally).
- h. Primer—Asphalt emulsion (obtain locally).
- i. Durabond 90 Joint Compound.
- j. Durabond 200 Adhesive.
- k. 1 1/4″ USG Brand Type S-12 Screws.

2.2 mixes

- a. Underlayment Compound—100 lb. Mastical: 3 cu. ft. sand: 6 1/2 to 7 1/2 gal. water.
- b. Topping—25 lb. topping compound: 5 to 5 1/2 qt. water.
- c. Primer—1 part asphalt emulsion: 1 part water (by volume).

2.3 equipment

- a. Cutting—Power saw with Black & Decker 58025 abrasive blade or equal.
- b. Welding—Short arc, automatic wire-feed, MIG type welder using silicon-bronze wire shielded with argon gas.

Part 3: execution

3.1 plank installation

Begin installation at one corner of floor; place plank with marked side up and with grooved edge forward. Install plank across joists with joints tightly fitted. Stagger end joints at least 24″ apart and position at least two rows apart within the same joist space.

Each full-length or shortened plank must bear on at least two supports. Place cut ends and edges over supports at floor perimeter and openings. At column interruptions where cantilever exceeds 18″, install capping channel grouted and anchored to column.

3.2 plank attachment

a. **Welded attachment**—Secure plank to each support at forward groove with a 3/16″ fillet weld, 5/8″ long. Weld top of plank where required around large cut-outs and columns.

b. **Clip attachment**—Secure plank to each support using #91 clips furnished and alternating clip direction where possible. Nail clips to plank with two 4d nails. Weld top of planks together for rigidity around large cut-outs and columns.

c. **Nail attachment**—Secure plank to wood supports with two 16d nails driven through plank at each support. Set heads flush with top of plank.

3.3 underlayment application

Repair voids, openings and damaged plank with plaster, leaving deck sound and smooth. Sweep deck clean and, for Mastical Underlayment, apply asphalt emulsion prime coat working it thoroughly into the surface. Allow to dry one to two hours but not longer than 24 hours before underlayment application. If dry primed area does not possess a sufficient degree of water repellency, apply a second prime coat. Spread and screed underlayment to required thickness and finish to a smooth surface.

Install Pyrorock Sound Underlayment Board with long dimension across floor planks. Center end joints between plank edges and stagger in adjacent rows. Bond each end joint to plank with a 3/8″ bead of Durabond Adhesive. Attach board to metal plank edging at each plank joint with four screws placed at each edge and 16″ o.c. in field of board. Flush joints and fastener heads smooth with Durabond 90 Joint Compound. Sand if necessary before flooring application.

3.4 topping application

Apply topping after underlayment has set, darkened to final color and taken up surface moisture. Wet down area if underlayment surface is absorbent; remove any standing water. Pre-fill all voids, relief joints and depressions. Scratch in thin coat of topping and double back to min. 1/16″ thickness. Trowel smooth; use water sparingly.

3.5 patching

Repair voids, holes, damage and other surface deformities with USG Underlayment Topping Compound mixed 25 lb. to 5 or 5 1/2 qt. water. Clean and pre-moisten surface, pre-fill, then scratch-in thin coat and double-back to min. 1/16″ thickness. Trowel smooth; use water sparingly.

Fill large openings, such as around columns, with Red Top Wood Fiber Plaster mixed to thick slurry. Reinforce with diamond mesh lath, place forms on underside, and pour slurry. Screed and trowel to smooth surface.

3.6 cleaning

At the completion of work, (clean all excess underlayment compound from adjacent walls or framing) remove all excess materials, tools, equipment and rubbish from the building and job site. Leave floors broom clean.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, MASTICAL, SHEETROCK, FIRECODE, AURATONE, RED TOP, PYROROCK, DURABOND.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606
SA-309/USG/1-77

roof decks **SA**

USG Metal Edge Gypsum Plank **306**

system folder

water-resistant gypsum plank for flat, pitched, mansard and fire-rated roof decks

USG Metal Edge Gypsum Plank offers a specially developed water-resistant core as an advantage never before available. With this unique roof plank, there is no worry about the core picking up moisture—no damage to exposed surfaces. It also offers the fire resistance, economy, structural strength and fast installation needed today.

description

USG Metal Edge Gypsum Plank is a precast structural roof deck unit 2″ thick, 15″ wide and 10 ft. long which weighs approximately 13 psf and is reinforced with galvanized steel tongue-and-groove edges and 16-ga. galvanized wire mat. It is erected over steel, concrete or wood joists to form a high-strength, structurally reinforced roof deck ready for application of roofing material. It can be used for factories, schools, shopping centers, or practically any type of building.

Plank is available for spans up to 7 ft. (see design properties, page 2 for load-carrying capacities). The plank conforms to Federal Specification SS-T-315a, Type I and ASTM C377-66.

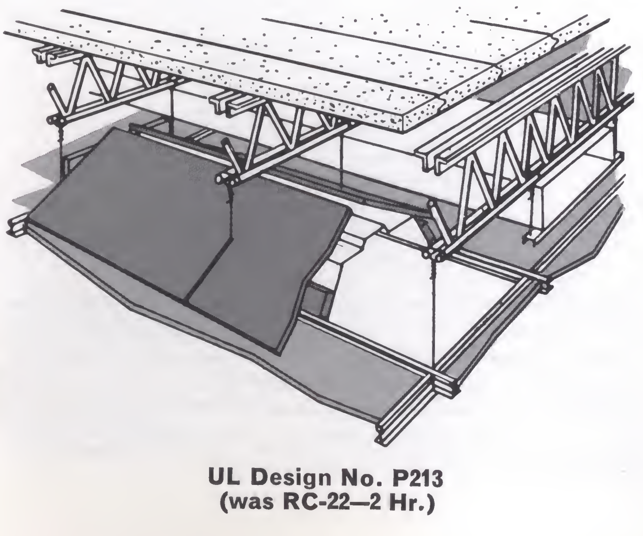
With USG Metal Edge Gypsum Plank, no added bar joists are required to comply with Factory Mutual Research Corp. Roof Deck Specification 19825. Optimum bar joist spacing reduces in-place costs of deck and joists and still qualifies for lowest insurance rates.

water resistance

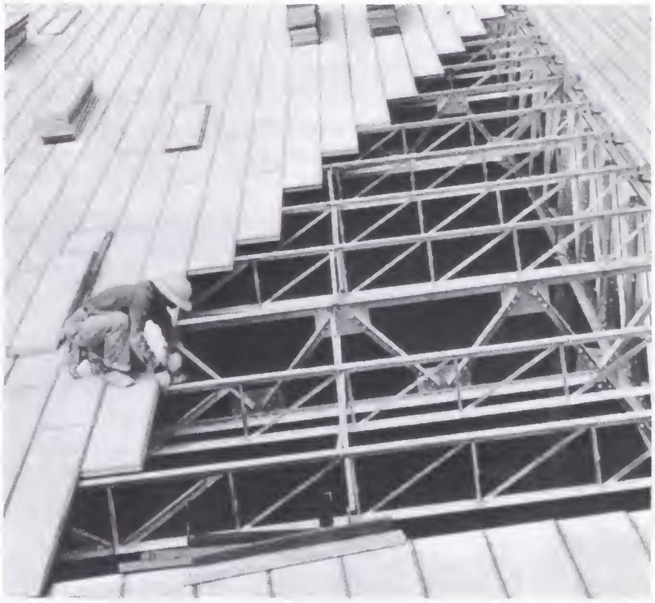
The plank's specially developed core materially decreases water absorption as compared to a conventional untreated gypsum core. Results of tests simulating a 1.5-in. rainfall in one-half hour reflected a gain in weight by moisture of only 1% and no surface damage or softness.

2-hour fire resistance

These assemblies provide a choice of 2-hour rated roof/ceiling designs: (1) UL Design No. P213 with acoustical panel ceiling reduces insurance rates as much as 45%; (2) UL Design No. P501, the only roof/ceiling design with a gypsum panel ceiling.



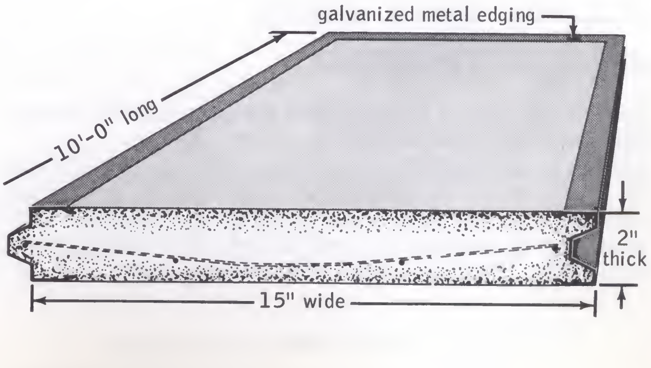
UL Design No. P213
(was RC-22—2 Hr.)



1. UL Design No. P213—USG Metal Edge Gypsum Plank clipped or welded to bar joists spaced up to 7′0″ o.c., ¾″ noncombustible roof insulation, light fixtures and air dampers, and ⅝″x2′x4′ Auratone Firecode Ceiling Panels on a fire-rated exposed grid suspension system.

2. UL Design No. P501—USG Metal Edge Gypsum Plank clipped or welded to bar joists spaced up to 4′0″ o.c., ¾″ noncombustible roof insulation, USG Metal Furring Channels 24″ o.c. wire-tied to joists, ⅝″ Sheetrock Firecode "C" Gypsum Panels screw-attached to channels, joints unfinished or taped.

Plank weight: 13 psf; thickness: 2″.



UNITED STATES GYPSUM
1976—1

3P PRECAST CONCRETE
gypsum plank roof system

USG Metal Edge Gypsum Plank provides fast, low-cost construction—extra weather-resistant features

easy, all-weather assembly

This time-proved roof deck material goes up fast and easy—eliminates many costly winter construction delays. Units are laid without grout. Metal Edge Roof Planks are clip-attached or welded to supporting steel or are directly attached through the plank to wood or concrete joists. With the water-resistant feature of the plank there is no need to rush the finish roofing to prevent moisture damage.

smooth level surface

An economical nailing-type deck with good holding power is provided. Metal edges are rugged and not easily damaged. Planks offer an excellent surface for flat or shingle roofing.

welded attachment

pitched & mansard roofs

Metal Edge Plank is ready to use on flat, pitched or mansard roofs. It can also be applied to curved or warped areas where the radius of the curve exceeds 150 ft. On steep-pitched roofs, welded application is recommended.

excellent lateral bracing and uplift resistance

USG Metal Edge Gypsum Plank provides excellent lateral uplift resistance when applied as recommended.

With standard clip attachment, wind uplift resistance is 470 lb. per clip. With welded attachment of plank on roof slopes up to 75°, ⅛"x⅜" fillet welds with 320 lb. shear per weld provide uplift resistance of 1,480 lb. per plank with supports spaced 3'0"; 635 lb. per plank with supports spaced 7'0" o.c.

clip attachment

I-beam action insures positive structural strength

The interlocking tongue-and-groove edges provide built-in I-beam action for superior strength and load distribution. Plank ends may occur off supports.

dependable

USG Metal Edge Gypsum Plank does a superior job at relatively low cost. United States Gypsum stands for integrity in design, consistent quality, and reliable service—qualities proved in more than 50 years of roof deck performance.

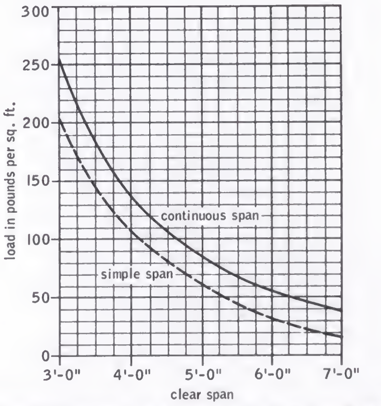
limitations

1. Gypsum plank roofs are practical for all buildings having normal humidity conditions and normal or moderately high temperature conditions. Where continuous high humidity or unusually high temperatures are expected, consult U.S.G.
2. Precautions should be taken to prevent thrust accumulations on steeply pitched roofs (see Specifications, page 4).
3. Maximum eave overhang based on 45-lb. total load is 3'2".

design properties

The graph below indicates the allowable uniformly distributed loads that can be superimposed on USG Metal Edge Gypsum Plank supported on various joist spacings. No load indicated on the graph will induce deflection greater than 1/240 of the span, nor exceed a design stress of 20,000 psi in the metal edging. Load-carrying capacities are shown for simple and continuous span conditions.

allowable uniform superimposed loads



Maximum allowable bending stress in metal edging is 20,000 psi. Values are based on simple and 2-span continuous bending moments at $\frac{wl^2}{8}$; three or more continuous spans bending moments at $\frac{wl^2}{10}$. Deflections are limited to 1/240 of the span and based on deflection constant as follows: $0.013 \frac{wl^4}{EI}$ for simple spans, $0.0054 \frac{wl^4}{EI}$ for 2 continuous spans and $0.0069 \frac{wl^4}{EI}$ for three or more continuous spans. Contact your United States Gypsum representative for information on highly concentrated loads. For bar joists spaced 7'-0" o.c., the effective clear span is only 6'-8" between the bar joist flanges, and the allowable superimposed load for MEP-7 is found at 6'-8" on the above chart.

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nail-holding power

type of roofing	description of nail	holding power dry plank—1½" penetration
built-up, shingles and tile	6d cut cornice	53 lbs.
	2" 10-ga. galv. roofing nail	74 lbs.
	1¾" SIMPLEX gypsum deck nail	121 lbs.
	1" SIMPLEX—TUBE-LOC nail	199 lbs.
	1½" ES—NAIL-TITE nail (1¼" penetration)	214 lbs.
	2" 11-ga. galv. roofing nail (1¼" penetration over ¾" rigid roof insulation)	72 lbs.

Tests conducted at U.S.G. Research Center

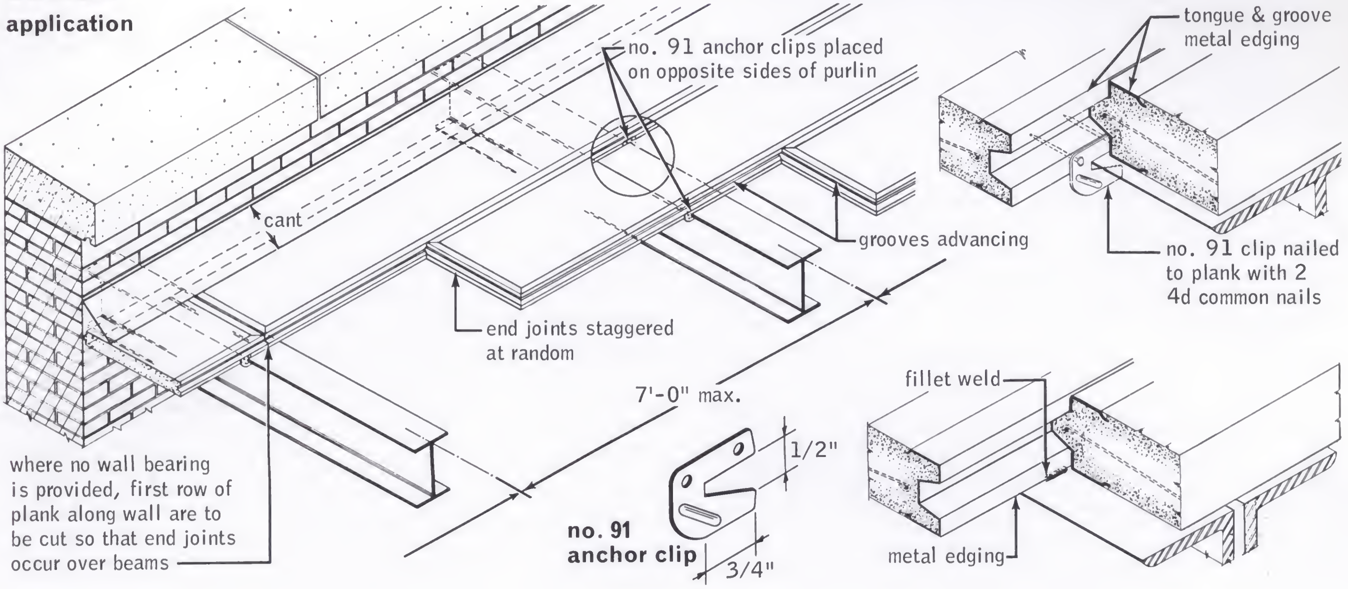
thermal insulation values

	"U" Factor for complete roof slab including built-in roof covering (btu per sq. ft., per hr., per deg. F. diff. in temperature)	
	winter	summer
plank without added insulation	0.51	0.43
plank with ½" insulation above (1)	0.30	0.27
plank with 1" insulation above (1)	0.21	0.20
2-hr. fire-rated systems (2)	0.13	0.12
plank with ½" insulation below (3)	0.26	0.23
plank with 1" insulation below (3)	0.17	0.16
plank with 1½" insulation below (3)	0.13	0.12

(1) Insulation is a rigid type wood fiber board (such as USG Roof Insulation) with "k" factor of .36. (2) Includes ¾" noncombustible insulation and ⅝" AURATONE FIRECODE Ceiling Panels or ⅝" SHEETROCK FIRECODE "C" Gypsum Panels. (3) Insulation is spray-on type with "k" factor of .26.

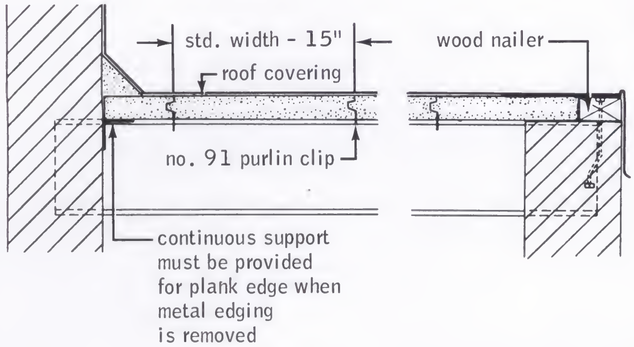
details

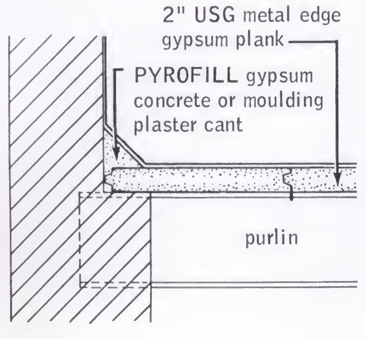
application


no. 91 anchor clips placed on opposite sides of purlin
cant
grooves advancing
end joints staggered at random
7'-0" max.
where no wall bearing is provided, first row of plank along wall are to be cut so that end joints occur over beams
tongue & groove metal edging
no. 91 clip nailed to plank with 2 4d common nails
fillet weld
metal edging
1/2"
3/4"
no. 91 anchor clip

parapet & end walls

scale: ¾" = 1'-0"

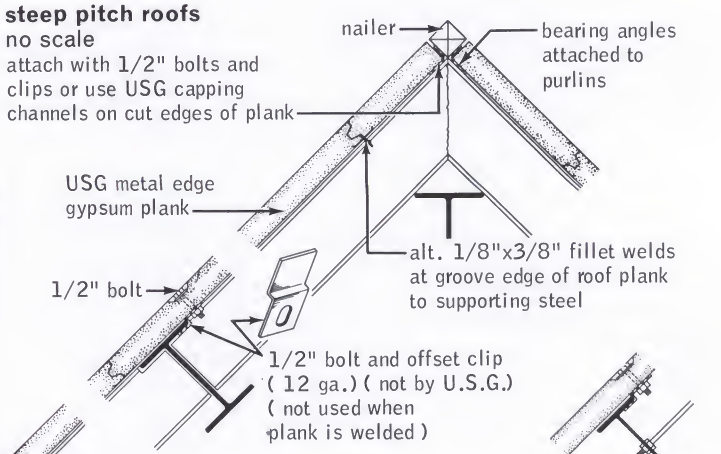

std. width - 15"
roof covering
no. 91 purlin clip
continuous support must be provided for plank edge when metal edging is removed
wood nailer

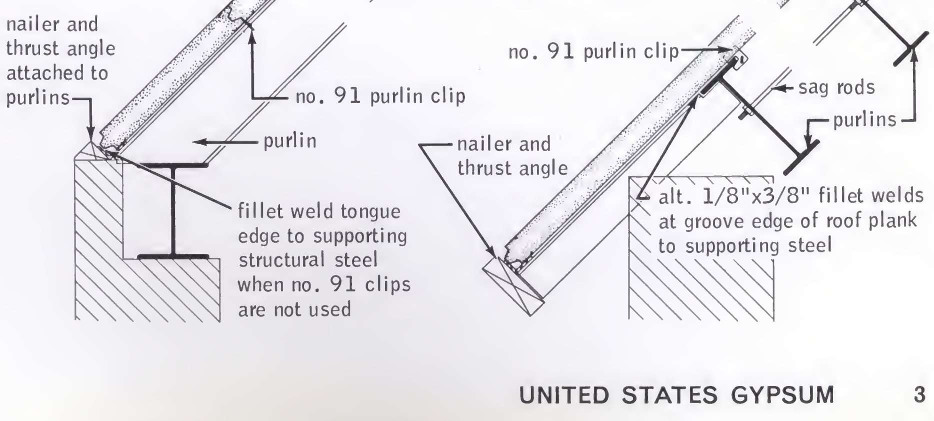

2" USG metal edge gypsum plank
PYROFILL gypsum concrete or moulding plaster cant
purlin

steep pitch roofs

no scale

attach with 1/2" bolts and clips or use USG capping channels on cut edges of plank


nailer
bearing angles attached to purlins
USG metal edge gypsum plank
alt. 1/8"x3/8" fillet welds at groove edge of roof plank to supporting steel
1/2" bolt
1/2" bolt and offset clip (12 ga.) (not by U.S.G.) (not used when plank is welded)


nailer and thrust angle attached to purlins
no. 91 purlin clip
purlin
fillet weld tongue edge to supporting structural steel when no. 91 clips are not used
no. 91 purlin clip
sag rods
purlins
nailer and thrust angle
alt. 1/8"x3/8" fillet welds at groove edge of roof plank to supporting steel

SA
306

roof decks

USG Metal Edge Gypsum Plank

specifications

notes to architect

1. *A 1½″ continuous support should be provided for terminal plank rows or plank cut so ends occur over supports. On pitched roofs, plank should be continuously supported at eaves, hips, ridges and valleys (see details, page 3). Thrust angles are recommended for all pitches, but may be omitted on pitches less than 30° where structural masonry bearing is provided. Standard attachment satisfactorily resists thrust for pitches up to 30°. For greater pitches up to 75°, welded attachment or clip attachment with added ½″ bolts and offset clips are recommended (see details).*

2. **Roofing** *should be applied as soon as possible after plank installation. For built-up roofing, shingles, slate and tile, a base sheet should be nailed dry using nails providing 1¼″ penetration into slab (see nailing data). If roofing is mopped on, take steps to prevent asphalt leakage through plank joints. For shingles, slates and tiles, square-cut nails providing 1½″ penetration should be used. Metal edging may require punching for proper application of non-ferrous nails.*

3. **Venting of Enclosed Spaces**—*All enclosed spaces beneath roof decks should have outside venting. Such venting by small louvers or openings does not appreciably affect attic temperatures. Please refer to the current ASHRAE Guide* (*Chapter 21*) *for complete information.*

4. **Painting**—*Plank must be dry, with edging free of grease and oil. Prime edging with METAL COAT Zinc Dust Primer; seal gypsum with SHEETROCK Sealer; allow to dry. Apply one or two coats GRAND PRIZE latex, PRO-KYD alkyd, or TAL Latex Wall Paint. If necessary to paint plank before gypsum is dry, prime edging as above and apply TEXOLITE Standard casein paint with 1½-oz. Dowicide "G" added per gal. of paste.*

5. *See separate U.S.G. Folders in this series for details and specifications on fire-rated AURATONE Ceiling Panels, SHEETROCK FIRECODE "C" Gypsum Panels and poured-in-place Gypsum Concrete Roof Decks.*

The most expedient way to obtain details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages or bundles, handled and stored on edge and stocked off the ground in a place providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 protection

Temporary wood protection shall be placed over gypsum plank areas exposed to repetitive impact or wheeled loads.

Part 2: products

2.1 materials

a. USG Metal Edge Gypsum Plank—2″x15″x10′0″, water-resistant core, with galvanized attachment clips, conforming to ASTM C377-66.

b. Nails—(4d common or 1½″-11-ga. galvanized roofing nails—*for attaching clips*) (16d common nails—*for attaching plank to wood framing*).

c. Fill—Pyrofill Gypsum Concrete or Red Top Moulding Plaster—*for ridges, hips and cants.*

2.2 equipment

a. Cutting—Power saw with Black & Decker 58025 abrasive blade or equal.

b. Welding—Short arc, automatic wire-feed, MIG type welder using silicon-bronze wire shielded with argon gas.

Part 3: execution

3.1 plank installation

Begin installation at one corner of roof area; place plank with marked side up and with grooved edge forward. Install plank across roof supports with joints tightly fitted and end joints staggered at least 30″ apart. Start and end alternate plank rows with full units or cut pieces long enough to bear on at least two supports. Remaining alternate rows may have planks bearing on one support. Place cut ends and edges over supports at roof perimeter and openings.

3.2 plank anchorage

Anchor planks to supports according to the following:

a. **Steel purlins**—Use galvanized metal clips attached with two 4d common nails per clip. Where span is 3′6″ or less, use clip on alternate supports.

b. **Steel purlins**—Weld metal edging to each support with a ⅛″x⅜″ fillet weld. Where span is 3′6″ or less, weld to alternate supports.

c. **Concrete joists**—Fire two power-driven studs through each plank at each support with adequate penetration for secure attachment. Where steel plates are embedded in joists, weld metal edging as in (b) above.

d. **Wood joists**—Use two 16d nails driven through plank at each support. Set heads flush with top of plank.

e. For pitches greater than 30°, use welded attachment or clip attachment plus additional ½″ standard bolts and offset clips as detailed.

3.3 ridges, hips, cants and drainage fills

Fill joints at ridges and hips with gypsum concrete. Form cant strips and drainage fills in place.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, PYROFILL, SHEETROCK, GRAND PRIZE, TEXOLITE, METAL COAT, PRO-KYD, RED TOP, AURATONE, FIRECODE, TAL.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606

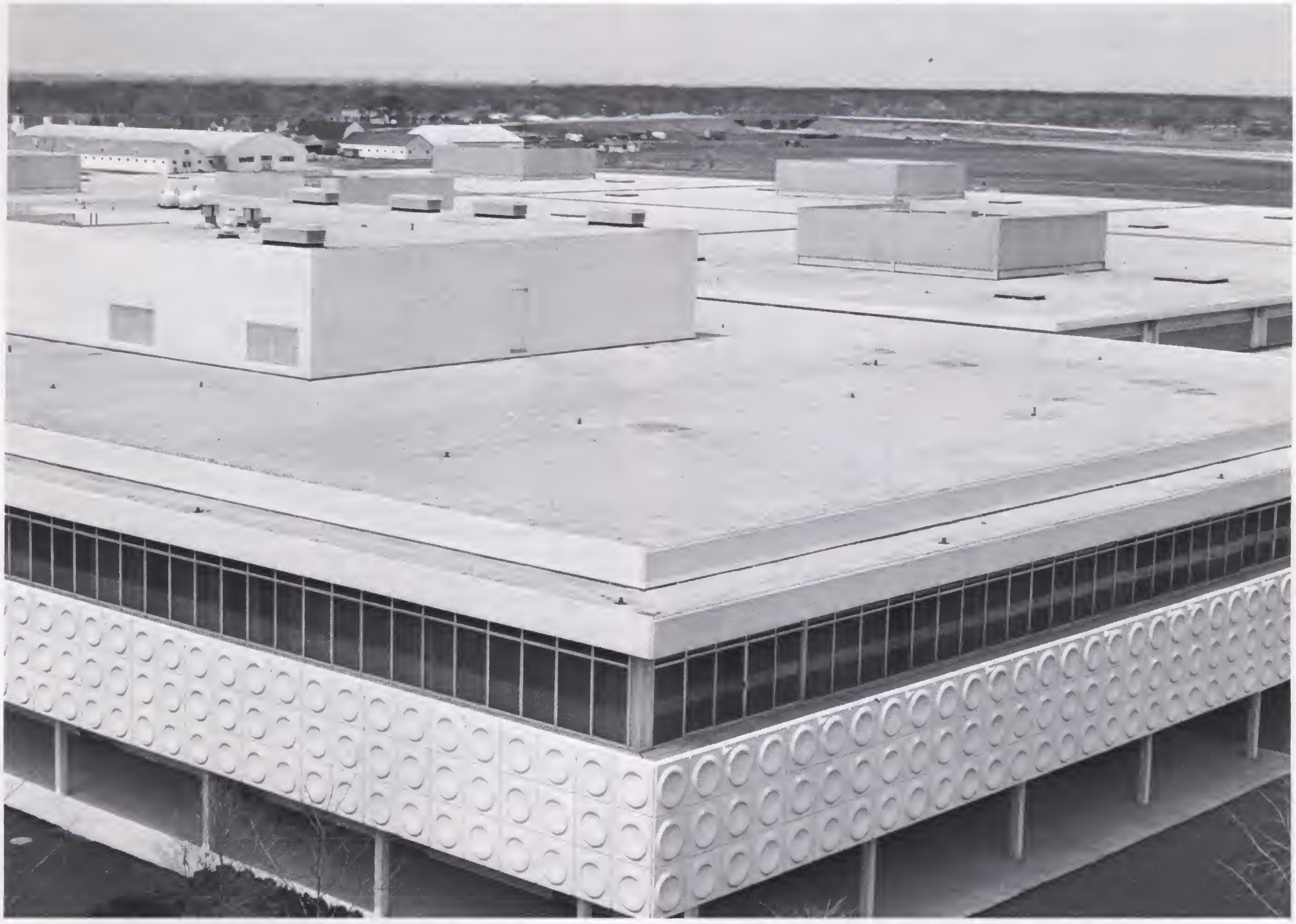
SA
305

U.S.G. Gypsum Roof Decks

dependable, efficient systems with low life-cycle costs

3.4/Un

system folder



Check these important benefits that cut initial cost and reduce operating and maintenance expense:

- **lower energy demands**
- **low-cost noise control**
- **improved fire protection**
- **lower insurance rates**
- **reduced construction costs**
- **high structural strength**
- **design versatility**
- **all-weather installation**

UNITED STATES GYPSUM
1977-1

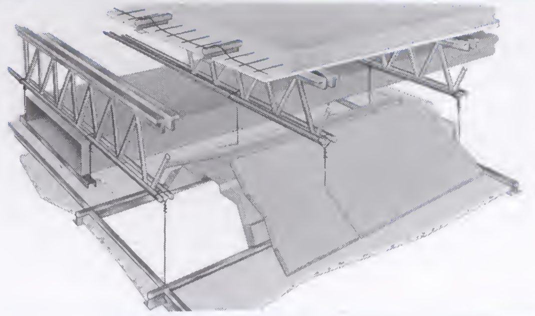
3P
CEMENTITIOUS DECKS
gypsum roof systems

wider choice

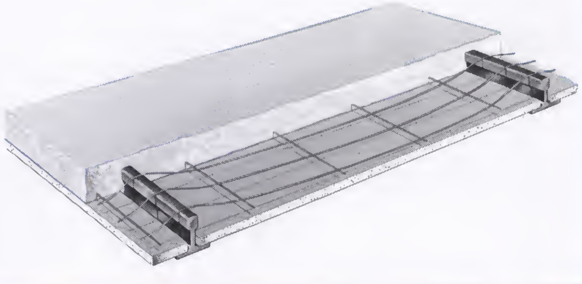
U.S.G. offers 5 roof deck systems

1. Fire-rated Gypsum Roof Decks of PYROFILL and THERMOFILL Gypsum Concrete are poured in place over galvanized reinforcing mesh and formboards supported by steel sub-purlins. Formboards are left exposed or a rated finished ceiling is suspended below. The result is a rock-hard, monolithic roof deck system that resists hurricane uplift wind forces up to 125 psf; has passed the UL Wind Uplift Class 90 test; resists seismic shock well in excess of building code requirements. Poured gypsum concrete takes any roof shape needed—flat, curved or pitched—to match function to form. Gypsum decks are rated noncombustible and their use dramatically reduces insurance rates for lifetime savings. Gypsum sets fast, so roofing can be applied without undue delay. These features make the systems ideal for schools, hospitals, warehouses, industrial construction and other buildings where up to 2-hour fire resistance is required.

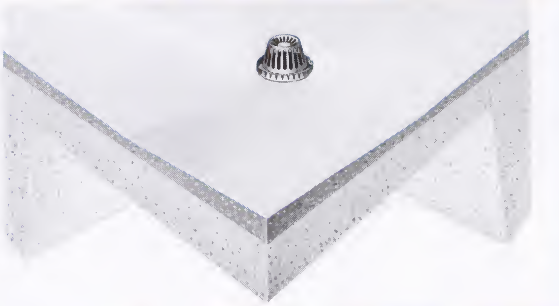
THERMOFILL has all the advantages of PYROFILL plus perlite aggregate that gives poured roof decks higher thermal insulation values with light weight.



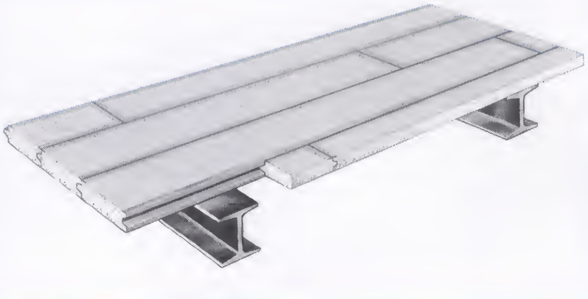
2. Non-rated Gypsum Roof Decks are poured systems that offer most of the features of rated decks. They meet normal live and dead load requirements for roof purlin spacings up to 11 ft. where roof framing is steel, concrete or wood. With prestressed concrete structural elements spaced up to 16 ft., clear spans up to 100 ft. may be obtained.



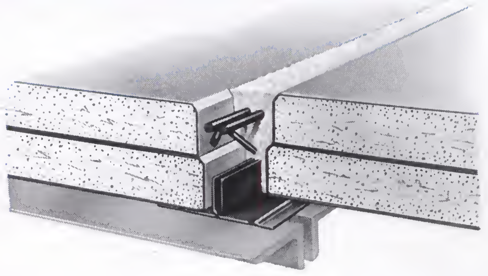
3. Drainage Slope Fills of quick-setting gypsum concrete are poured in place over structural roof decks of poured or precast concrete or wood. They provide smooth, monolithic sloped surfaces that are easily roofed. Notably low in cost, these lightweight fills offer rapid installation even in cold and freezing weather. Also ideal for use over old roof decks to provide slope to drains.



4. USG Metal Edge Gypsum Plank, with a specially developed water-resistant core, is precast at the factory for installation in any weather on flat or steeply pitched roofs. This structural unit 2″ thick, 15″ wide and 10 ft. long, weighs approximately 13 psf and is reinforced with galvanized T&G edges and 16-ga. wire mat. Planks are quickly laid over steel, concrete or wood joists to form a noncombustible, structurally reinforced roof deck ready for roofing. For details, refer to U.S.G. System Folder SA-306 on Metal Edge Gypsum Plank.



5. USG SPAN-ROCK Gypsum Roof Planks offer simple-to-install, low-cost, dry deck systems ideal for use over conventional bar joists or purlins on smaller projects. These units combine with steel framing to reduce deck weight 30% to 50% under other dry systems. They qualify for 1½-hr. fire rating and provide thermally efficient assemblies meeting most live loads on spans up to 10 ft. The factory-laminated gypsum board planks, 2″ thick, 2 ft. wide, and 8 or 10 ft. long, weigh 8.4 psf and are supported by regular roof deck sub-purlins. Refer to U.S.G. Folder IR-564 for details, load-span data and specifications.



limitations

1. Gypsum roof decks are suitable for normal temperature and humidity conditions. Acid fumes, generally not harmful to gypsum, may affect framing. Where such abnormal conditions prevail, consult U.S.G. for recommendations.

2. Certain recommendations concerning drying and ventilation, expansion and contraction, decorating and roofing must be adhered to for satisfactory performance (see Specifications, page 14 for details).

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fire ratings

a choice of 2-hour fire-rated systems with exposed formboard or suspended acoustical ceilings

The UL-tested U.S.G. roof deck systems listed below assure the extra protection required in specific applications. U.S.G.'s policy of comprehensive testing of complete roof systems offers high-quality decks that meet all major building codes. Fire-rated gypsum decks also qualify for lower insurance rates than insulated steel decks.

UL Design No. P676 (was RC-23—2 Hr.)

2-in. Pyrofill Poured Gypsum Concrete and Keydeck reinforcing mesh on ½-in. exposed Sheetrock or 1-in. Firecode Formboard supported by Keydeck truss tees spaced 32¾ in. o.c. on fireproofed beams 8 ft. o.c. max. Slab weight: 11 psf.

UL Design No. P677 (was RC-15—2 Hr.)

2-in. Thermofill Poured Gypsum Concrete and Keydeck reinforcing mesh on 1 to 1½-in. exposed Firecode Formboard supported by Keydeck truss tees spaced 32¾ in. o.c. on fireproofed beams spaced 7 ft. o.c. max. Slab weight: 8 psf.

UL Design No. P207 (was RC-6—2 Hr.)

2-in. Pyrofill Poured Gypsum Concrete reinforced with Keydeck wire mesh on ½-in. Sheetrock or 1-in. Firecode Formboard supported by Keydeck bulb tees spaced 32 in. o.c. and welded to 12-in. steel bar joist 4 ft. o.c. max. and Auratone Firecode or Airson Auratone Firecode Acoustical Panels suspended on an exposed rated grid system. Rating also applies when ½″ Sheetrock Formboard supported by USG Sub-purlins are substituted. Slab weight: 11 psf.

UL Design No. P002 (was RC-13—2 Hr.)

2-in. Thermofill Poured Gypsum Concrete and Keydeck reinforcing mesh on ½-in. Sheetrock or 1-in. Firecode Formboard supported by Keydeck bulb tees spaced 32⅝ in. o.c. and welded to 10-in. steel bar joist spaced 4 ft. o.c. max. and Auratone Firecode or Airson Auratone Firecode Acoustical Tile suspended on a standard concealed Z-spline system. Rating also applies when ½″ Sheetrock Formboard is supported by USG Sub-purlins. Slab weight: 8.2 psf.

UL Design No. P213 (was RC-22—2 Hr.)

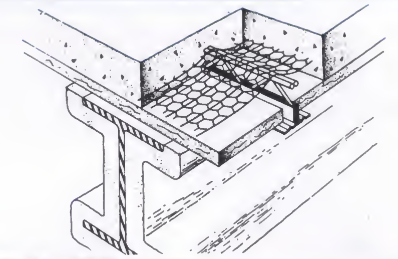
USG Metal Edge Gypsum Plank clipped or welded to bar joists spaced up to 7 ft. o.c., ¾-in. noncombustible roof insulation, light fixtures and air dampers, Auratone Firecode Ceiling Panels on an exposed rated grid. Plank weight: 13 psf.

UL Design No. P501 (rating—2 Hr.)

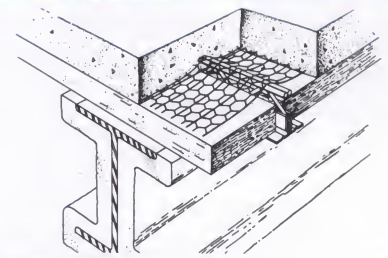
USG Metal Edge Gypsum Plank clipped or welded to bar joists spaced up to 4 ft. o.c., ¾-in. noncombustible roof insulation, USG Metal Furring Channels 24 in. o.c. wire-tied to joists, ⅝-in. Sheetrock Firecode "C" Gypsum Panels screw-attached to channels, joints unfinished or taped. Plank weight: 13 psf.

UL Design No. P228 (rating—1½ Hr.)

USG Span-Rock Gypsum Plank grouted in place on truss tees spaced 24 in. o.c., tees welded to bar joists spaced 7 ft. o.c., 3½-in. noncombustible roof insulation and Auratone Firecode Ceiling Panels on an exposed rated grid system. Plank weight: 8.4 psf.



UL Design No. P676



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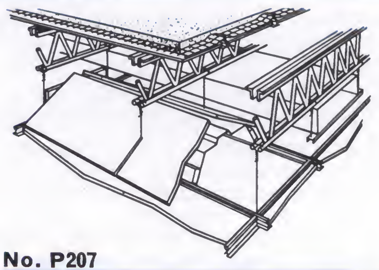
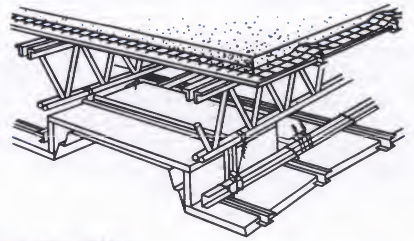
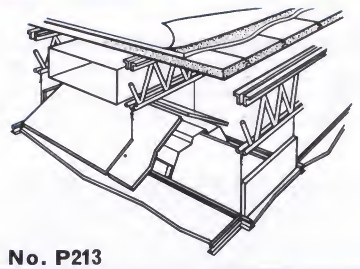


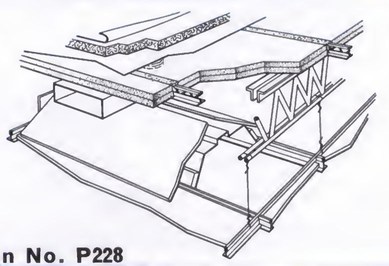
UL Design No. P207



UL Design No. P002



UL Design No. P213



UL Design No. P228

design versatility

in the roof deck...

U.S.G. gypsum concrete can be shaped to virtually any roof configuration—curves, pitches, sawtooth angles or flat. It provides the adaptability needed to design buildings of distinctive appearance with no sacrifice of construction efficiency.

over the deck...

Gypsum concrete simplifies building design and permits use of constant height columns and level decks. Slopes for drainage are readily screeded over concrete, wood or insulated decks.

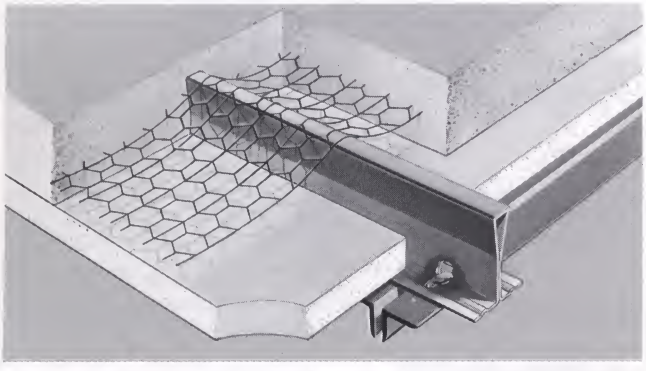
A certification program assures that PYROFILL or THERMOFILL Gypsum Concrete meets or exceeds industry standards for dry density and compressive strength (see page 15).

PYROFILL Gypsum Concrete is mill-formulated and composed of calcined gypsum and wood chips or shavings. It is mixed with clean water, only, at the job site and poured-in-place over permanent formboards or other decks as a drainage fill. Thermal resistance (R) value is 0.67 per inch. PYROFILL complies with ANSI A59.1-1968 (R1972) and ASTM C317-64 (1970) Standards.

THERMOFILL Gypsum Concrete is mill-formulated and composed of calcined gypsum and graded perlite aggregate. It is mixed with clean water, only, at the job site and poured-in-place over permanent formboards. Thermal resistance (R) value is 0.87 per inch. THERMOFILL complies with ANSI A59.1-1968 (R1972) and ASTM C317-64 (1970) Standards. Not available north of 40th Parallel from Oct. 1 to April 1, except for use as drainage slope fill.

Steel sub-purlins vary in size, weight and shape and are selected according to required span and loading. They provide lateral bracing, anchorage against uplift, and restrict deck movement due to temperature change. Sub-purlin spacing accommodates 24″, 32″, or 48″ formboard widths with a slight tolerance for ease of formboard placement. Sub-purlins are spaced approx. 24⅝″, 32⅝″, or 48⅝″ o.c. and are welded to the structural framing members. When 48″ wide formboard is used with light sub-purlin sections, supporting steel spacing should not exceed 36″ o.c.

USG Steel Sub-purlins are roll-formed from 16-ga., 18-ga. and 20-ga. hot-dipped galvanized metal. An exclusive lightweight design provides low in-place costs for bar joists spacings up to 6′0″ (see table, page 9). They offer necessary roof support over short spans for any U.S.G. poured gypsum concrete roof deck. Assemblies using USG Sub-purlins qualify for 2-hour UL fire rating (UL Designs P207 and P002).


Cost-saving USG Sub-purlin is ideal for short spans; quick one-weld installation resists uplift.

USG Sub-purlins anchor the slab against uplift forces and supply strong lateral bracing. Galvanized finish requires no painting. Quick one-weld installation eliminates usual double welds at sub-purlin ends and affords uplift resistance up to 500 lbs. with ⅜″ weld through web and flanges to framing.

Other sub-purlins, neither manufactured nor sold by U.S.G., are available for heavier loads and longer spans (see page 9).

Reinforcing mesh for PYROFILL is one of following types:

1. KEYDECK—A galvanized wire mesh, woven with 16-ga. straight wires and 19-ga. diagonal wires.
2. 48-1214—A galvanized, welded wire mesh with 12-ga. longitudinal wires at 4″ o.c. and 14-ga. transverse wires at 8″ o.c.

The effective cross-sectional area of reinforcing mesh placed at 90° to the sub-purlins is .026 sq. in. per foot of mesh width. U.S.G. neither manufactures nor sells reinforcing mesh.

in the formboards... concealed or exposed

Four U.S.G. Formboards offer complete freedom of design. They are used singly or in combination to provide insulation, fire resistance, moisture resistance, pleasing appearance, economy of installation, or sound control. They serve both as a formboard for the poured gypsum concrete and, when needed, as semi-finished ceilings eliminating costs of additional ceiling material. Their superior fire resistance often makes added fireproofing materials unnecessary and often reduces insurance costs.

SHEETROCK Formboard is a rigid gypsum board, treated to resist mildew effectively where adequate ventilation is provided. Two-hour fire ratings and 46 STC are available with 2″ gypsum slabs and exposed tees. Ideal for almost every roof deck need, concealed or exposed. Makes economical ceilings for warehouses, light manufacturing buildings, schools—any construction where durability and low cost are desired.

FIRECODE Formboard is a rigid, highly insulative board suitable for 2-hour fire-rated construction. The mineral fibers will not contribute to mildew growth. Reduces reflected noise —provides performance up to 50 NRC (see table at right). Available in two types:

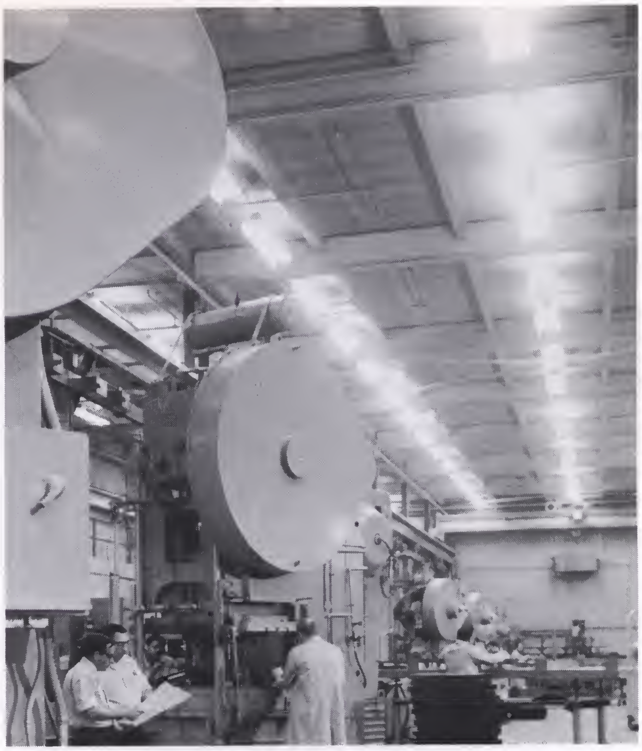
Custom has a white factory-applied finish; used for high ceilings that require a semi-finished surface with built-in acoustical properties and good light reflectance.

Economy has a natural matte surface with a medium tan color. Ideal for concealed areas where a ceiling will be suspended below the deck or where ceiling appearance is not an important factor.

Asbestos Cement Formboard is a rigid, industrial type board that provides more resistance to heat and humidity than other formboards. Ideal for use on exterior soffits and above heat-producing machinery where temperatures at the board are less than 125° F.

noise control

built-in acoustical performance to help meet OSHA standards



Gypsum decks help designers comply with OSHA requirements. They effectively control outside noise and absorb noise created by equipment. Light-reflective U.S.G. formboards lower plant illumination and maintenance costs.

As a result of the Occupational Safety and Health Act of 1970, plant management is faced with the choice of maintaining noise levels within specified ranges, or limiting the duration of employees' exposure to high noise levels. Since reduced exposure has the effect of increasing production costs, every effort should be made in new plant design to limit noise levels.

Another regulation requires all plants with Federal contracts over $10,000 to eliminate continuous noise over 90 dbA where workers are present.

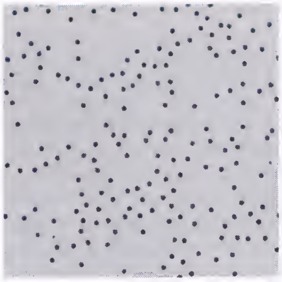
U.S.G. roof deck systems with gypsum concrete poured over exposed glass-fiber formboard offer the most economical method of incorporating a large sound-absorbent surface in new plant construction. The glass-fiber formboards effectively absorb sound and reduce reverberation. Interior noise levels can be reduced up to 7 db with these formboards, which offer .75 to .95 NRC. Glass-fiber formboards are not manufactured by U.S.G.

Exterior noise is efficiently attenuated by the high sound transmission loss of the gypsum deck. Pyrofill Gypsum Concrete, poured 2″ thick over Sheetrock Formboard, developed STC 46, three points higher than the best-rated steel deck system, as tested by Riverbank Acoustical Laboratories. See U.S.G. brochure IR-548 for complete design data on noise control with U.S.G. roof deck systems.

U.S.G. formboards

SHEETROCK Formboard

FIRECODE Formboard—Economy



FIRECODE Formboard—Custom

Asbestos Cement Formboard

formboard characteristics

type	SHEETROCK formboard	FIRECODE mineral fiber formboard				asbestos formboard
		custom	economy			
thickness	½″	1″	¾″	1″	1½″, 1¾″, 2″	¼″
width	32″	32″ & 24″	24″	32″ & 24″	32″ & 24″	32″
length	up to 12′ max.	4′ to 6′8″	4′ to 6′8″	4′ to 6′8″	4′ to 8′	48″
weight/sq. ft.	2.025	1.65	1.05	1.40	2.15, 2.50, 2.85	2.4
R-value	0.45	3.70	2.78	3.70	5.55, 6.48, 7.40	0.06
flame spread	15-20(1)	5-10(2)		0-5(2)		0-5
noise reduction coefficient	—	.50		.40		—
light reflection coefficient	66%	65%		—		40%
specification compliance	ASTM C318-67 Federal Spec. SS-L-30D Type V	Federal Spec. SS-S-118a Class 25	Federal Spec. SS-S-118a Class 25			Federal Spec. SS-B-755a Type U

(1) Flame spread ratings determined by Underwriters Laboratories testing. (2) Flame spread rating determined by Southwest Research Institute.

structural strength

to withstand hurricane winds, wind uplift and roof loads...

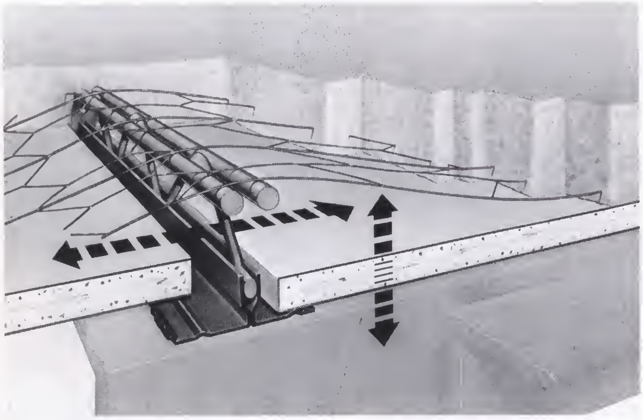
U.S.G. roof deck systems form a monolithic unit that structurally integrates the roof deck with the roof framing. The roof deck is a rigid diaphragm that provides firm resistance to harmonic wave action (as uplift is applied and relaxed).

Gypsum concrete decks have high structural strength and a hard surface. In tests, standard assemblies supported uniform roof loads over 450 psf when wet and 700 psf when dry. At dry densities of 48 to 50 pcf for Pyrofill and 38 to 40 pcf for Thermofill, the compressive strength of the slab is 500 psi min. This conforms to ANSI A59.1-1968 (R1972) and ASTM C317-64 (1970) for Class A gypsum concrete; exceeds the strength of other insulating fills; provides a better base for roofing and adequate support for normal roofing equipment.

U.S.G. roof decks with long, clear spans require fewer bar joists than steel decks to resist this action which can cause damage to roof coverage and deck. To provide the necessary protection for Types A and B steel decks, Factory Mutual Specification 1-28 for Class I Construction requires added bar joists—also more roof insulation to resist damage to deck caused by foot traffic. Safety factors are also designed into gypsum roof deck components, so they don't have to be added later when cost is greater.

In hurricane areas, such as Florida, standard gypsum roof decks have withstood as many as five fierce blows without damage. This is because U.S.G. roof decks resist uplift action by nearly four times the normal requirements of 35 psf when constructed with bulb or truss tee sub-purlins welded to the primary framing.

UL Wind Uplift Class 90 has been assigned to a poured gypsum concrete roof deck assembly based on qualified testing. The system tested consisted of Pyrofill Gypsum Concrete over Sheetrock Formboard with bulb tees, Keydeck mesh and roof covering attached with Nail-Tite nails. This U.S.G. assembly successfully withstood the rigorous test—while conventional 22-, 20- and 18-ga. steel and lightweight concrete roof deck systems have not. Extended coverage insurance rates are generally lower for assemblies having passed the test, especially in Gulf Coast and Prairie States where high wind velocities are prevalent.



Open-web construction allows gypsum fill to flow through truss tee to embed it in a solid mass of gypsum concrete. This, plus welding of truss tee to supports, provides strong composite resistance to shear and uplift. The mesh reinforces the deck and transfers tensile stress. Cracking and deflection caused by impact and seismic shock are minimized.

to resist seismic shock or to reinforce the building...

U.S.G. roof decks provide excellent lateral bracing. They have withstood some of the most severe earthquakes in California and have been approved as rigid diaphragms in Los Angeles and in many of the 1,000 cities which use the Uniform Building Code.

U.S.G. poured gypsum roof decks with bulb tees or truss tees structurally tie the framing system together to reinforce the building and provide resistance to wind and seismic loads—*without extra cost.*

economy

U.S.G. decks give more for less . . . in fire-rated systems

Initial savings can amount to thousands of dollars in construction investment when U.S.G. fire-rated roof decks are specified. A UL 2-hour fire-rated system often costs only 5¢ psf more than a non-rated system . . . up to 60¢ *less* than other types of 2-hour UL fire-rated decks. U.S.G. decks enjoy ready acceptance from major code bodies and insurance companies.

in non-rated systems

Savings are achieved through the unique advantages U.S.G. roof decks offer in strength, fire resistance and durability. Savings also occur through low "U" values which reduce costs of air-conditioning and electrical heating; and through highly light-reflective U.S.G. formboards which can lower illumination costs. Both these features offer positive measures to conserve energy fuel—to keep their costs from rising—and operating costs from spiraling.

in fast installation

Up to 30,000 sq. ft. of gypsum deck can be poured in one day. The quick-setting action of gypsum concrete permits roofing almost immediately. There's no wait for curing as with ordinary lightweight concrete decks; no costly delays in erection schedules.

U.S.G. roof decks can be poured in cold weather; in any weather in which men can work. The quick-setting action of gypsum concrete makes it one of the best roof deck materials for winter construction. The exothermic reaction in the slab protects it from freezing before set takes place and the slab is capable of carrying design loads.

in reduced construction costs

U.S.G. gypsum roof decks meet Factory Mutual Noncombustible Classification to qualify for lowest extended-coverage insurance rates without the clear-span limitations imposed upon steel roof deck designs. With gypsum decks, bar joist spacing can be optimized for major cost reductions over steel and lightweight concrete deck systems.

in insurance savings

Building owners can save up to 55% annually on Property Damage and Business Interruption Insurance when U.S.G. Poured Gypsum Concrete Deck Systems are specified instead of steel deck assemblies, according to a study by the National Loss Control Service Corp. This firm developed rate comparisons for gypsum and steel roof decks in five areas of the U.S.A. for shopping centers, manufacturing plants and warehouses both with and without automatic sprinkler protection (details available on request). The comparison at left below shows almost $7,000 annual savings for a typical sprinklered industrial plant near Chicago. For the same unsprinklered building the annual savings are over $22,000.

value	80% co-insurance	2-hour gypsum roof deck rate per $100	steel roof deck rate per $100	difference per $100	annual premium savings
property damage insurance (300,000 sq. ft. area—sprinklered)					
building $3,000,000	80%	$0.08	$0.177	$0.097	$2,328
contents $4,000,000	80%	$0.08	$0.177	$0.097	$3,104
		total fire and extended coverage premium savings			$5,432
business interruption insurance ($2,000,000 annual value at 80% of building fire insurance rate)					
$2,000,000 x 0.80 x .097/$100					$1,552
		total annual insurance premium savings			$6,984

in total value

U.S.G. gypsum roof decks are the best value in the industry. They offer maximum economy without sacrificing safety or strength. They resist rot, warpage, and deterioration to cut maintenance costs. They can also reduce continued operating costs such as heating, air conditioning and insurance.

Here's proof U.S.G. roof decks offer more

	steel	mineralized wood fiber	lightweight concrete	PYROFILL poured gypsum
UL-rated assembly	**P409** 2-hour rating	**P403** 2-hour rating	**P215** 2-hour rating	**P207** 2-hour rating(1)
approx. cost/ deck & ceiling only	$2.10 per sq. ft.	$2.10 per sq. ft.	$1.70 per sq. ft.	$1.45(2) $1.65(3) per sq. ft.
acoustical properties	minimal (plaster)	minimal (plaster)	NRC .60 to .70	NRC .60 to .70
light reflectance	determined by finish applied	determined by painting	85%—Class A	85%—Class A
year-round construction	yes	yes	only above 40°F.	yes
ceiling	brown coat plaster	finished plaster	½-in. gypsum board over ⅝" ceramic acoustical tile	⅝" AURATONE FIRECODE acoustical ceiling panels(4)
lateral restraint lb./l.f.	300	400	670	1060 KEYDECK mesh, 840 1214 mesh
wind uplift UL Class 90	no	yes	no	yes
insulation U-factor deck & ceiling	.21	.21	.13	.18(1), .11(2)
ceiling flexibility accessibility	none unless access panels installed	none unless access panels installed	fully accessible	fully accessible

(1) Possible extended-coverage insurance advantage. (2) With SHEETROCK Formboard. (3) With 1" FIRECODE Formboard. (4) 5 different patterns.

thermal insulation

to cut energy costs

U.S.G. poured gypsum decks put high thermal performance where it can be most effective—in the roof. Low "U" factors cut heating/cooling energy costs, save initial equipment costs by lowering capacity requirements, and reduce investment interest and maintenance costs. Needed resistance to heat transmission can often be obtained in a poured gypsum deck without added insulation. A standard 3-in. deck of PYROFILL Concrete over FIRECODE Formboard provides as much thermal insulation as a steel deck with 1½" rigid insulation. The tables below show design insulation values for various U.S.G. roof deck-ceiling combinations and for roof deck systems with exposed formboards.

design weight and insulation—"U" values (1)
(for fire-rated and non-rated decks)

deck system	dry deck weight psf(3)	wood, mineral or perlite roof insul. thickn-in.	"U" values—exposed formboard	"U" values—⅝" AURATONE Panels or Tile(4)		
				no added insul.	plus 2" insul. blankets	plus 3" insul. blankets
2" PYROFILL Gypsum Concrete ½" SHEETROCK Formboard	11	0	.34	.18	.08	.06
		½	.23	.14	.07	.06
		1	.18	.12	.06	.05
		1½	.14	.10	.06	.05
2" PYROFILL Gypsum Concrete 1" FIRECODE Formboard	10	0	.16	.11	.06	.05
		½	.13	.10	.06	.05
		1	.11	.09	.05	.04
		1½	.10	.08	.05	.04
2¼" PYROFILL Gypsum Concrete ¼" Asbestos-Cement Formboard	12	0	.37	—	—	—
		½	.25	—	—	—
		1	.18	—	—	—
		1½	.15	—	—	—
2" THERMOFILL Gypsum Concrete ½" SHEETROCK Formboard	8	0	.30	.17	.07	.06
		½	.21	.13	.07	.05
		1	.16	.11	.06	.05
		1½	.13	.10	.06	.05
2" THERMOFILL Gypsum Concrete 1" FIRECODE Formboard	8	0	.15	.11	.06	.05
		½	.13	.09	.06	.05
		1	.11	.08	.05	.04
		1½	.09	.07	.05	.04

deck system	dry deck weight psf(3)	wood, mineral or perlite roof insul. thickn-in.	"U" values—¾" ACOUSTONE Tile or Panels(5)			"U" values—½" SHEETROCK Gypsum Panels(6)			
			"F"	Foil-Back (1)	Foil-Back (2)	Regular	Foil-Back (1)	Foil-Back (2)	plus Acoustical Tile(6)
2" PYROFILL Gypsum Concrete ½" SHEETROCK Formboard	11	0	.17	.13	.07	.24	.16	.07	.16
		½	.14	.11	.06	.18	.13	.07	.13
		1	.12	.09	.06	.14	.11	.06	.11
		1½	.10	.08	.05	.12	.10	.06	.10
2" PYROFILL Gypsum Concrete 1" FIRECODE Formboard	10	0	.11	.09	.05	.13	.11	.06	.10
		½	.10	.08	.05	.11	.09	.05	.09
		1	.09	.07	.05	.10	.08	.05	.08
		1½	.08	.07	.04	.09	.07	.05	.07
2" THERMOFILL Gypsum Concrete ½" SHEETROCK Formboard	8	0	.16	.12	.06	.22	.15	.07	.15
		½	.13	.10	.06	.17	.12	.06	.12
		1	.11	.09	.05	.14	.11	.06	.11
		1½	.10	.08	.05	.11	.09	.05	.09
2" THERMOFILL Gypsum Concrete 1" FIRECODE Formboard	8	0	.10	.09	.05	.13	.10	.06	.10
		½	.09	.08	.05	.11	.09	.05	.09
		1	.08	.07	.05	.09	.08	.05	.08
		1½	.07	.06	.04	.08	.07	.05	.07

(1) Btu/sq. ft./hr./deg. F temp. diff. (includes built-up roofing); for winter conditions—heat flow up, except as noted; (2) summer conditions—heat flow down. (3) Weight of sub-purlin or roofing not included. PYROFILL density: 50 lb. per cu. ft., THERMOFILL density: 39 lb. per cu. ft. (4) Mechanically suspended. (5) Furred suspended. (6) With ¾" ACOUSTONE "F" Tile adhesively applied.

thermal insulation—"U" values (1)
(for 2" gypsum concrete over FIRECODE Formboard)

deck system		no insulation		1" insulation		no insulation—⅝" AURATONE Panels or Tile Ceiling (2)	
type of fill	formboard thickness (3)	winter	summer	winter	summer	winter	summer
2" PYROFILL Gypsum Concrete	¾"	.19	.18	.12	.12	.13	.12
	1"	.16	.15	.11	.11	.11	.11
	1½"	.13	.12	.09	.09	.09	.09
	1¾"	.11	.11	.09	.08	.09	.08
	2"	.10	.10	.08	.08	.08	.08
2" THERMOFILL Gypsum Concrete	¾"	.18	.17	.12	.11	.12	.11
	1"	.15	.14	.11	.10	.11	.10
	1½"	.12	.11	.09	.09	.09	.09
	1¾"	.11	.10	.08	.08	.08	.08
	2"	.10	.09	.08	.07	.08	.07

(1) Cross tees required for other than purlin lengths. (2) Suspended ceiling and vented space. (3) Sub-purlins should extend min. of ¼" above the top surface of formboard.

bulb tee sub-purlins

sub-purlin		total safe uniform load (psf) with gypsum decks on spans shown														max. eave overhang
type	wt. (lb./lin. ft.)	5′0″	5′6″	6′0″	6′6″	6′8″	7′0″	7′6″	8′0″	8′6″	9′0″	9′6″	10′0″	10′6″	11′0″	
112	1.40	67	56	47	40											2′2″
158	1.60	92	76	64	54	52	47									2′9″
168	1.75		109	91	78	74	67	58	51							3′4″
178	2.05			119	101	95	87	76	66	59	52					3′11″
218	3.00						119	103	91	80	72	64	58	52	48	4′10″
228	3.65								129	114	102	91	82	74	68	5′10″

Loads based on 3-span condition and 39,600 psi design stress for 112, 158, 168, 178 tees and 33,000 psi for others. Loads are for bulb tee acting alone, live-load deflection L/240 or less and 32⅝″ spacing; for 24⅝″ spacing, multiply by 1.32. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by tees, calculate overhang separately. For wt./sq. ft., multiply wt./lin. ft. by .49 for 24⅝″ tee spacing, .37 for 32⅝″ spacing and .25 for 48⅝″ spacing.

truss tee sub-purlins

sub-purlin		total safe uniform load (psf) with gypsum decks on spans shown																max. eave overhang
type	wt. (lb./lin. ft.)	5′0″	5′6″	6′0″	6′6″	6′8″	7′0″	7′6″	8′0″	8′6″	9′0″	9′6″	10′0″	10′6″	11′0″	11′6″	12′0″	
5-6-17-1¾″	1.03	65	54	45														2′7″
5-6-17-2″	1.03	75	63	53	45	43	39											2′9″
2-5-17-2″	1.20	119	90	82	70	67	61	53	46	41								3′6″
1-5-17-2″	1.26		107	90	76	73	66	57	50	45	40							3′6″
000-5-14-2″	1.78						89	77	68	60	54	48	43	39				4′2″
5-6-17-2½″	1.05	96	80	67	57	54	49	43	38									3′1″
2-3-17-2½″	1.27			107	91	86	78	68	60	53	47	43						3′11″
1-3-17-2½″	1.32			116	98	94	85	74	65	58	52	46	42					4′1″
000-3-14-2½″	1.85							101	89	78	70	63	57	51	47			4′9″
5-6-17-3″	1.07	118	98	82	70	67	60	53	46	41								3′5″
2-3-17-3″	1.30			131	111	106	96	84	73	65	58	52	47	43				4′4″
1-3-17-3″	1.35				121	115	104	91	80	71	63	56	51	46	42			4′6″
000-3-14-3″	1.88						141	123	108	96	86	77	69	63	57	52	48	5′3″

Loads based on 3-span condition, truss tee acting alone, and 32⅝″ spacing. For 24⅝″ spacing, multiply by 1.32; for 2-span condition, multiply by .8; for single span condition, multiply by .72. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by tees, calculate overhang separately. For wt./sq. ft., multiply wt./lin. ft. by .49 for 24⅝″ tee spacing; .37 for 32⅝″ spacing and .25 for 48⅝″ spacing.

USG sub-purlin

type	wt. (lb./lin. ft.)	total safe uniform load (psf) with poured gypsum decks on spans shown					max. eave overhang
		4′0″	4′6″	5′0″	5′6″	6′0″	
20-ga.	0.73	75					1′8″
18-ga.	0.95	90	90	73			2′3″
16-ga.	1.18	90	90	77	64	54	2′4″

Loads are for sub-purlin composite construction and based on continuous span condition, deflection L/240 or less and 32¼″ o.c. spacing. Eave overhang based on 45 psf load. With nailers, angles, gutters or soffits supported by sub-purlins, calculate overhang separately.

type	wt. (lb./lin. ft.)	sub-purlin spacing	total safe uniform load (psf) with precast roof deck units on spans shown				
			4′0″	4′6″	5′0″	5″6′	6′0″
20-ga.	0.73	24″	38	30			
18-ga.	0.95	24″ 32″	55 41	43 33	35	29	
16-ga.	1.18	24″ 32″	60 51	54 41	44 33	36	30

Loads based on 3-span condition, sub-purlin acting alone and max. allow. 60 psf superimposed load for plank. Loads shown will not exceed L/240 or sub-purlin design stress. Subtract weight of plank and roof covering to find live-load capacity.

nail-holding power (1)

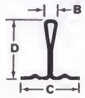
description of nail	PYROFILL gypsum concrete			THERMOFILL gypsum concrete		
	removal —1 day	removal —7 days	removal —slab dry	removal —1 day	removal —7 days	removal —slab dry
1½″ ES NAIL-TITE —plain finish (2) (1¼″ penetration)	67(3)	77	136	60(3)	67	141

(1) Resistance to direct pull in lbs., for nails placed 24 hrs. after pouring slab. Test slabs had 2″ min. thickness and dry density of 48 pcf for PYROFILL and 38 pcf for THERMOFILL. Nailholding power decreased at densities less than those cited.

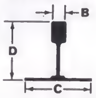
(2) Manufactured by E. S. Products, New Rochelle, N.Y., and recommended for smooth coat type roofing.

(3) Provides min. 40 lbs. immediate holding power required by roofing manufacturers.

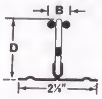
USG sub-purlin



bulb tee



truss tee



physical properties (dimensions in inches)

USG sub-purlins and bulb tees

type	B	C	D
USG	21/64	1½	1¾
112	⅜	1½	1½
158	⅜	1 9/16	1⅝
168	7/16	1½	2
178	9/16	1⅝	2
218	11/16	2⅛	2⅛
228	⅞	2 1/16	2 5/16

truss tee

type	B	C	chord wire gage
5-6-17-1¾″	9/16	1¾	5
5-6-17-2″	9/16	2	5
2-5-17-2″	21/32	2	2
1-5-17-2″	23/32	2	1
000-5-14-2″	⅞	2	000
5-6-17-2½″	9/16	2½	5
2-3-17-2½″	23/32	2½	2
1-3-17-2½″	¾	2½	1
000-3-14-2½″	29/32	2½	000
5-6-17-3″	9/16	3	5
2-3-17-3″	23/32	3	2
1-3-17-3″	¾	3	1
000-3-14-3″	29/32	3	000

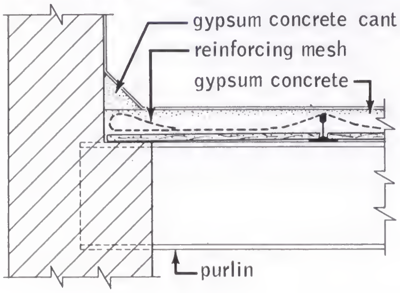
Properties shown are taken from data furnished by manufacturer.

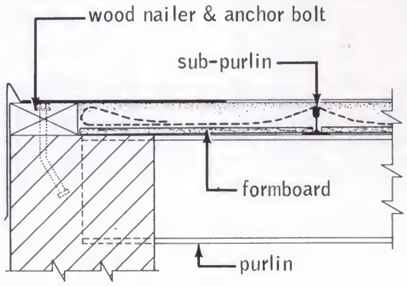
details

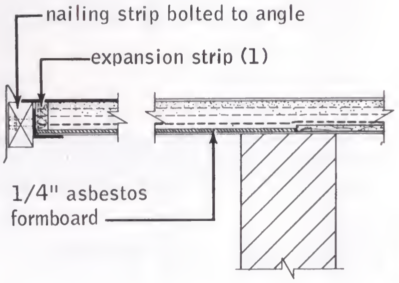
scale: ¾″=1′-0″

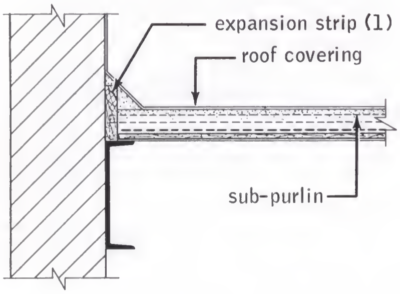
application over beams and bar joists

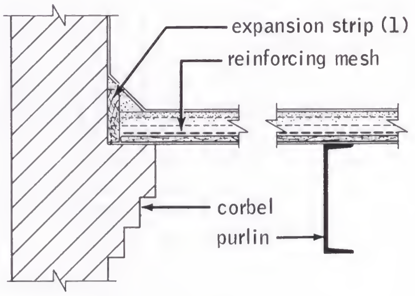
wall details

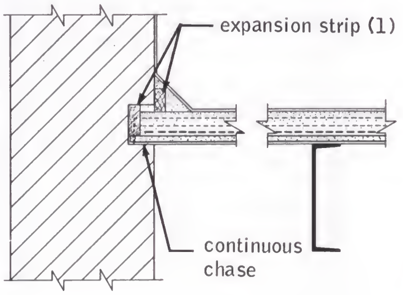




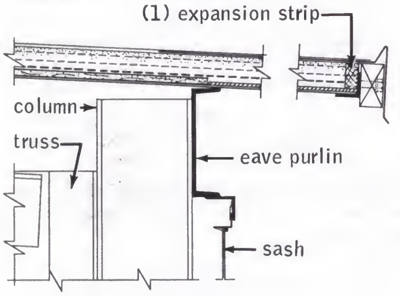


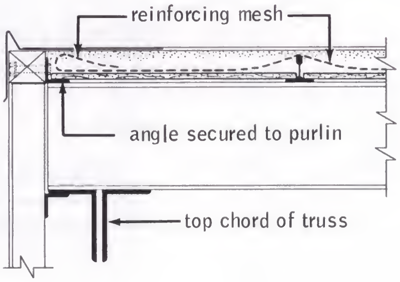


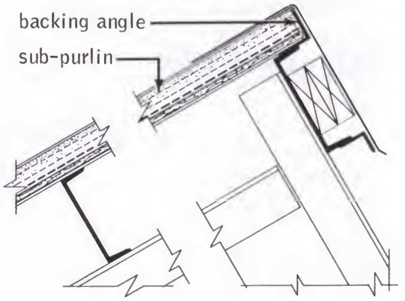




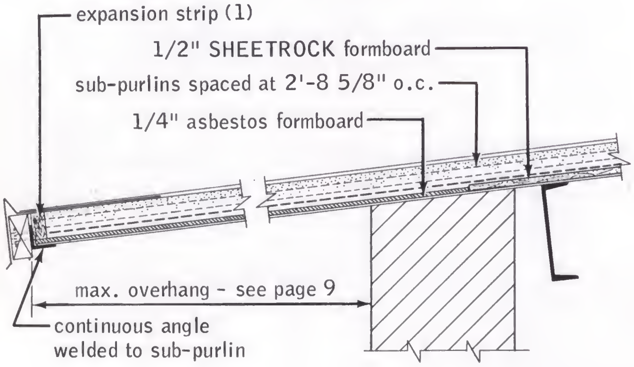
eaves

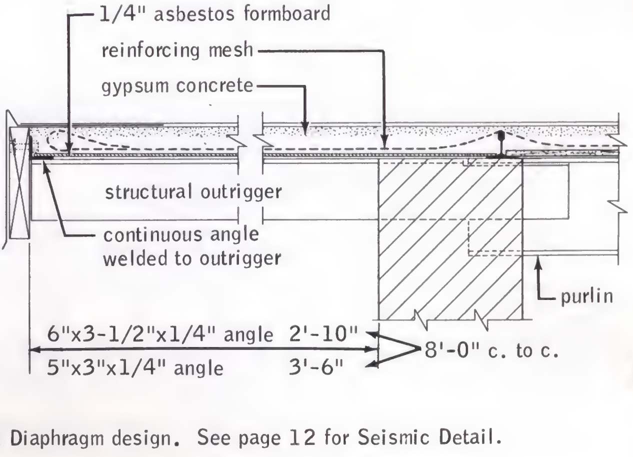






eave & gable overhang
(overhang based on 45#/□′ total load)


expansion strip (1)
1/2" SHEETROCK formboard
sub-purlins spaced at 2'-8 5/8" o.c.
1/4" asbestos formboard
max. overhang - see page 9
continuous angle welded to sub-purlin



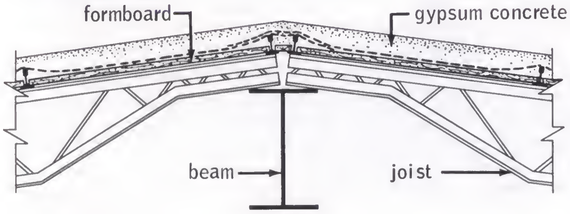
(1) Expansion strips are not recommended for seismic Approved Diaphragm design. See page 12 for Seismic Detail.

details

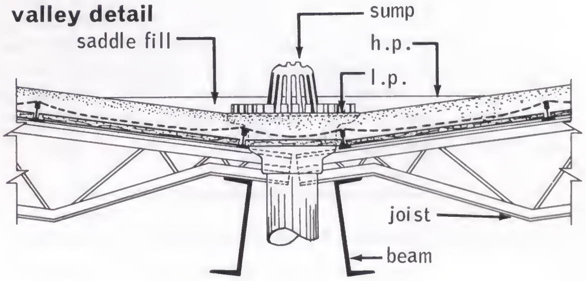
scale: ¾″=1′-0″

application over beams and bar joists

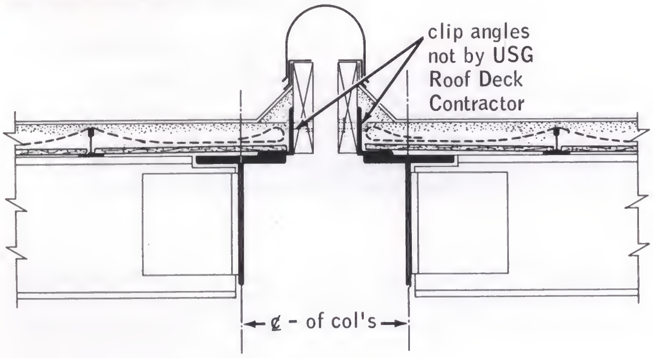
ridge detail



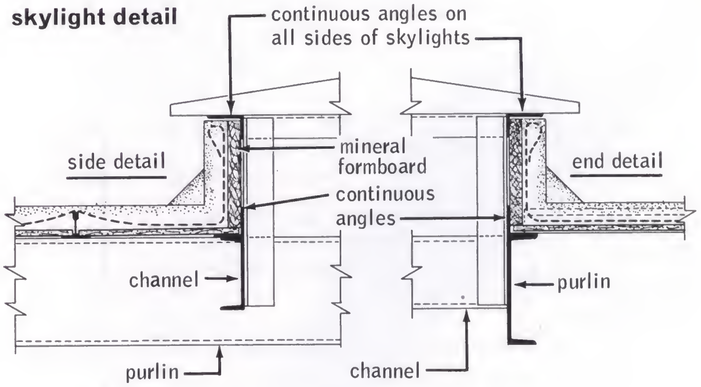
valley detail



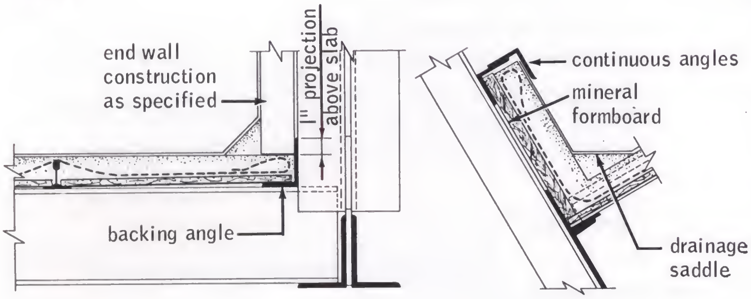
expansion joint



skylight detail

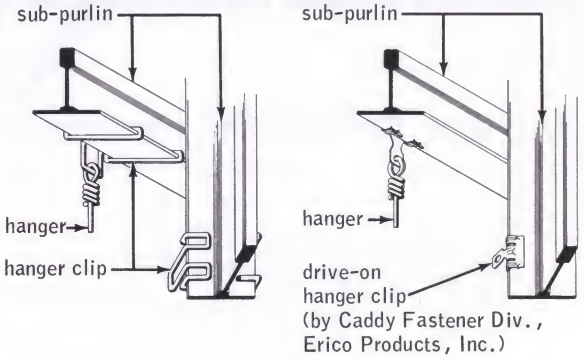


curbs

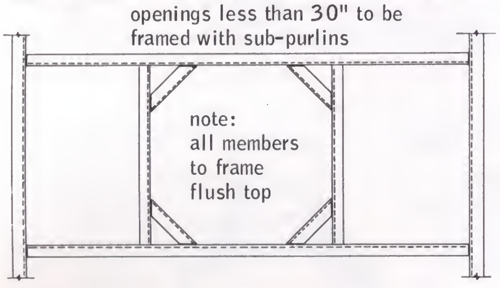


hanger details for suspended ceilings

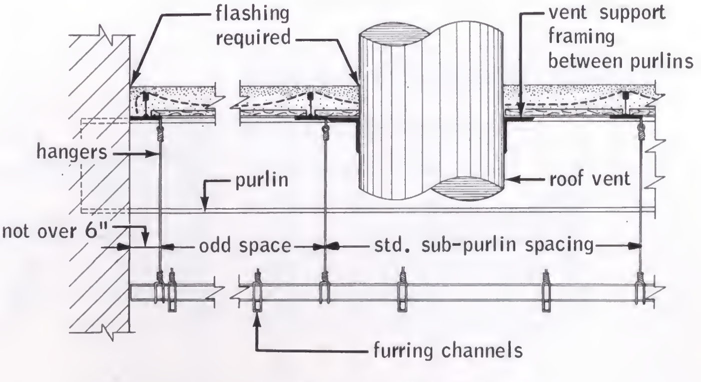
hanger and hanger clips - not by USG Roof Deck Contractor (a convenient lather's wire tie may be used for suspension)


sub-purlin
sub-purlin
hanger
hanger clip
hanger
drive-on hanger clip (by Caddy Fastener Div., Erico Products, Inc.)

typical framing around openings larger than 30″


openings less than 30" to be framed with sub-purlins
note: all members to frame flush top

Note: all miscellaneous structural steel, such as channels, wood nailers, angles, hangers and channel grillage, attached to roof framing, are not by USG Roof Deck Contractor.



suspended ceilings

approved seismic diaphragm

scale: ¾″=1′-0″

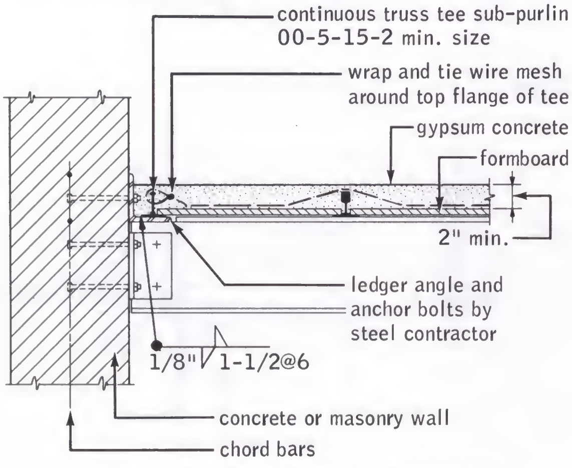
U.S.G. poured gypsum roof decks with truss tees and reinforcing mesh offer an approved construction to resist seismic shock. The gypsum fill flows through the truss tee to form a rigid diaphragm with excellent resistance to shear and uplift. Design procedure is similar to that of reinforced concrete using gypsum stress values allowed by the applicable code (see table). See U.S.G. Bulletin IR-61 for complete design and supporting test information.

allowable shear—reinforced gypsum concrete

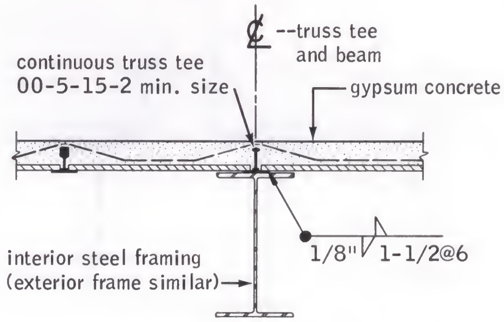
gypsum concrete thickness, in. (1)	reinforcing mesh type	allowable shear values, lb. per lin. ft. (2)	
		PYROFILL (3) with truss tees	THERMOFILL (4) with truss tees
2	4″x8″ #12—#14	840	710
2	KEYDECK	1060	910
2½	4″x8″ #12—#14	890	760
2½	KEYDECK	1120	960

(1) Based on 500 psi compressive strength gypsum concrete Class A.
(2) California Administrator Code—Title 21 data varies slightly in shear calculations and field application. Consult U.S.G. representative for assistance.
(3) See UBC Std. No. 24-13 and Research Recommendation 1312, ICBO.
(4) See Research Recommendation 1683, ICBO.

sub-purlins parallel to shear-resisting elements

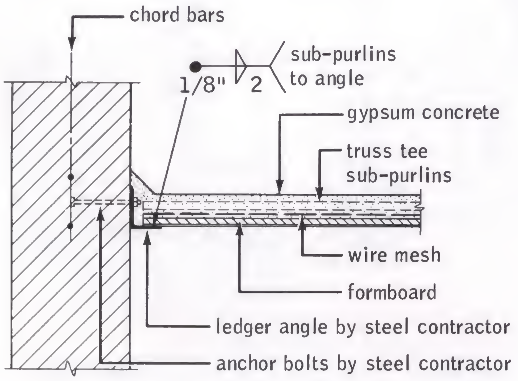

continuous truss tee sub-purlin
00-5-15-2 min. size
wrap and tie wire mesh around top flange of tee
gypsum concrete
formboard
2" min.
ledger angle and anchor bolts by steel contractor
1/8" 1-1/2@6
concrete or masonry wall
chord bars

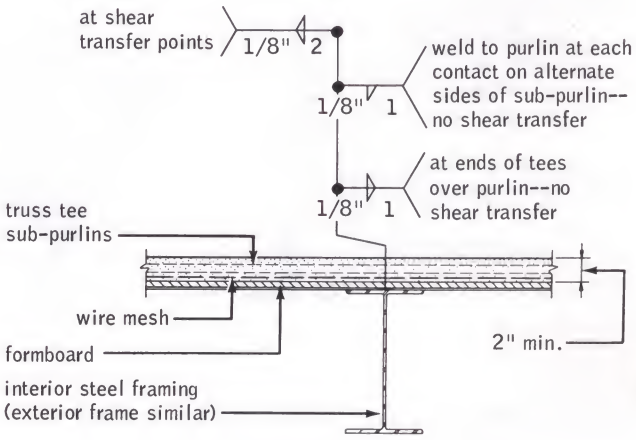
truss tee shear transfer element



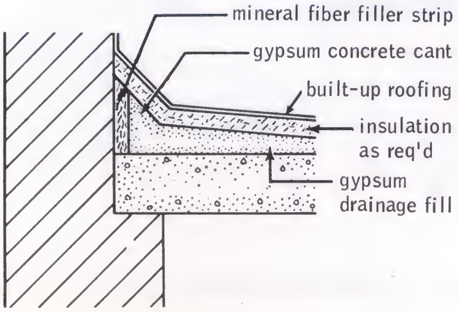
truss tee shear transfer element

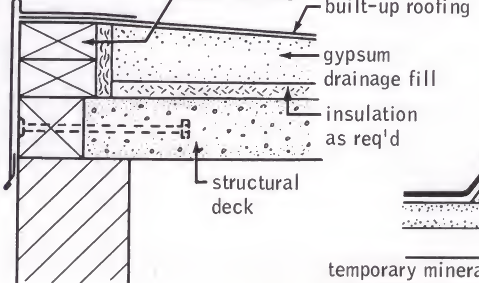
sub-purlins perpendicular to shear-resisting element

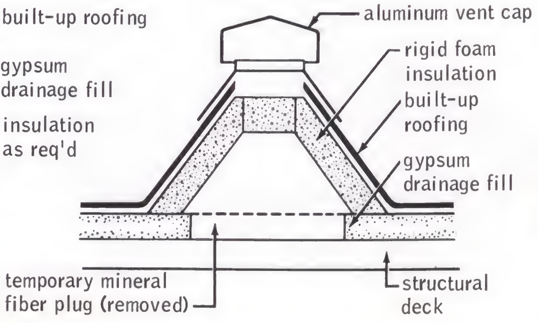




drainage slope fill details







drainage slope fill

economical assemblies for simple, fast, all-weather installation

In this assembly, gypsum concrete is mechanically mixed, poured-in-place over flat decks and screeded to provide proper drainage. Applied in thicknesses from 2″ to 8″ when roofing is directly attached—from 0″ to 8″ when roof insulation is adhesively applied atop the fill. Suitable for use over poured concrete, wood, precast concrete or cement tile decks, gypsum concrete in new construction or remodeling. Sets up quickly into a smooth monolithic slab ready for immediate roofing. Also may be installed over polystyrene or polyurethane rigid roof insulation where greater thermal resistance is required. Most features of U.S.G. roof deck systems are available with gypsum concrete drainage slope fill.

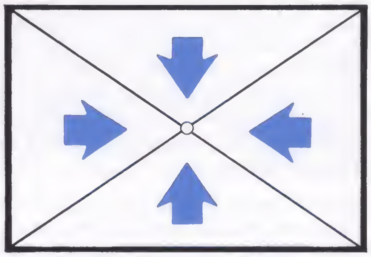


figure 1

limitations

1. Drainage slope fill systems are not structural roof decks.
2. Certain recommendations concerning roofing, ventilation, expansion and contraction must be adhered to for satisfactory performance of gypsum drainage slope fill (see Specifications, page 14 for details).

average thickness

When gypsum fill is sloped to an inside drain, (see Fig. 1), the average thickness (t_a) can be determined from the following formula, where (t_h) is the thickness at the high point and (t_l) is the thickness at the low point:

$$t_a = \tfrac{2}{3}(t_h - t_l) + t_l$$

fill thickness

The graph (Fig. 2) may be used to determine fill thickness at the high point for various slopes and horizontal distances.

Example: Determine the fill thickness at the high point if the distance to the drain is 20 ft. and the desired slope is ⅛″ per ft.

Solution: Enter graph (Fig. 2) at 20 ft. on the vertical scale and move right horizontally to the ⅛″ per ft. slope line. The fill thickness for the high point will be found directly below on the horizontal scale and is 2½″.

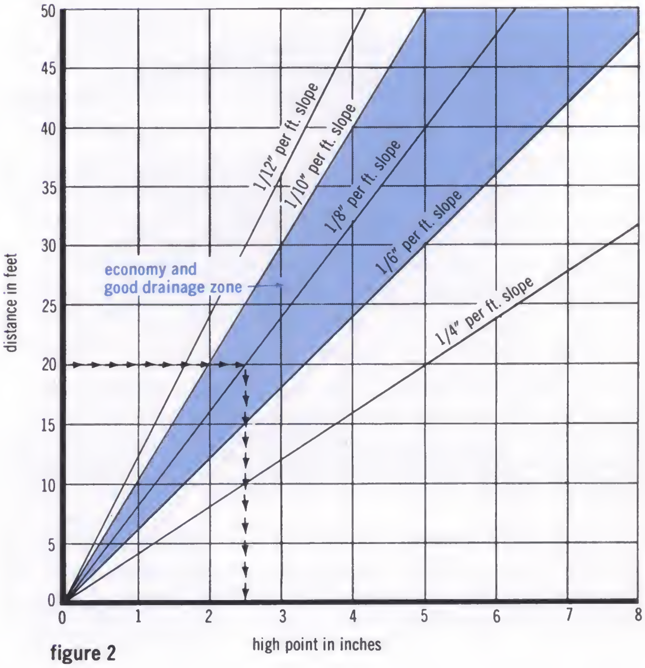


figure 2

thermal transmission—"U" values (1)

(for gypsum concrete drainage fill and rigid cellular polystyrene or glass fiber insulation over 6″ concrete roof deck)

average thickness gypsum fill—in.	dry slab wt.—psf(2)		insulation thick.—in.		no ceiling—deck exposed				⅝″ AURATONE Panels or Tile			
	PYROFILL	THERMOFILL	poly-styrene	glass fiber	PYROFILL		THERMOFILL		PYROFILL		THERMOFILL	
					W	S	W	S	W	S	W	S
2	8.3	6.7	0	0	.34	.30	.30	.27	.18	.16	.17	.15
			1	1¹⁄₁₆	.15	.14	.14	.13	.11	.10	.10	.10
			2	2¼	.09	.09	.09	.09	.07	.07	.07	.07
2½	10.4	8.3	0	0	.31	.27	.27	.24	.17	.15	.15	.14
			1	1¹⁄₁₆	.14	.13	.13	.12	.10	.10	.10	.09
			2	2¼	.09	.09	.09	.08	.07	.07	.07	.07
3	12.5	10.0	0	0	.28	.25	.24	.22	.16	.14	.14	.13
			1	1¹⁄₁₆	.13	.13	.12	.12	.10	.09	.09	.09
			2	2¼	.07	.09	.08	.08	.07	.07	.07	.07
3½	14.6	11.7	0	0	.25	.23	.22	.20	.15	.14	.14	.13
			1	1¹⁄₁₆	.13	.12	.12	.11	.10	.09	.09	.09
			2	2¼	.09	.08	.08	.08	.07	.07	.07	.06
4	16.7	13.3	0	0	.23	.21	.20	.18	.14	.13	.13	.12
			1	1¹⁄₁₆	.12	.12	.11	.11	.09	.09	.09	.08
			2	2¼	.08	.08	.08	.08	.07	.07	.06	.06

(1) Btu/sq. ft./hr./deg. F. temp. diff. (includes built-up roofing); W—for winter conditions, heat flow up; S—for summer conditions, heat flow down.
(2) Weight is for gypsum fill only.

USG roof deck systems with prestressed concrete roof framing

In these systems the gypsum roof deck slab is used in combination with prestressed concrete roof framing sections which may be spaced up to 16 ft. o.c. With structural units such as the LIN-TEE member, the gypsum deck is poured over the entire area to form a monolithic slab. With alternate types of units the gypsum slab is located between the prestressed concrete framing members.

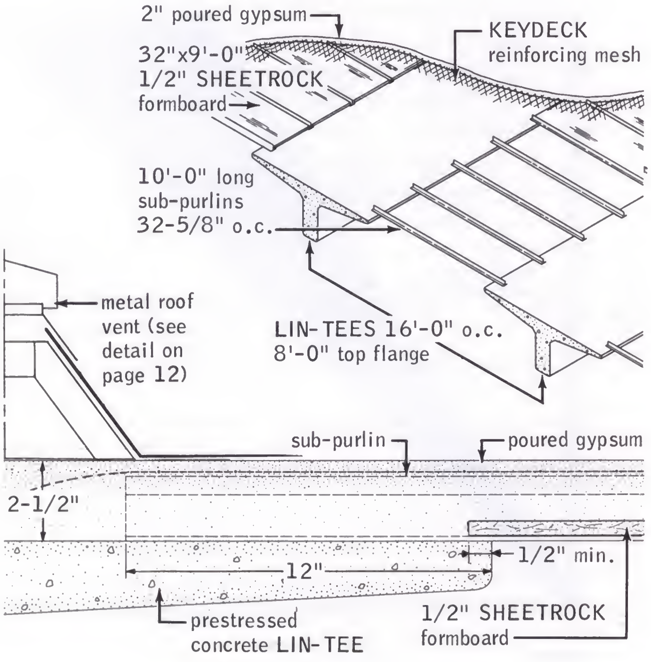
Steel sub-purlins are spaced 32⅝″ o.c. and securely welded to steel bars or plates embedded in the prestressed concrete roof framing sections. Formboards are placed atop the bottom flanges of the sub-purlins. Reinforcing mesh is laid over the entire area in the LIN-TEE systems; only across the sub-purlins when precast concrete members are used. Metal roof vents are installed atop fill over LIN-TEE members to release vapors.

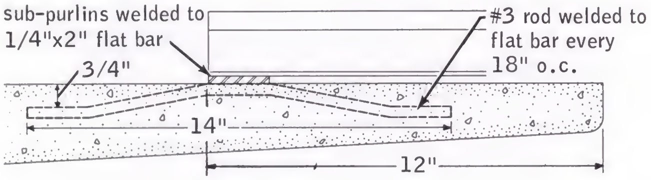
Gypsum roof decks used in combination with prestressed precast concrete structural elements provide a number of highly desirable features:

1. Clear spans up to 100 ft. with shallow structural depths.
2. Fire-resistant construction without added fireproofing.
3. Simplicity of construction for fast erection.
4. Economical initial cost and low maintenance.

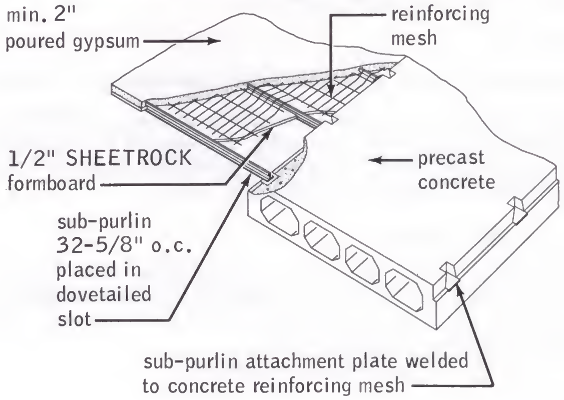
These features make this system ideal for use where long clear unsupported spans are required such as in warehouses, shopping centers and school gymnasiums.

LIN-TEE system

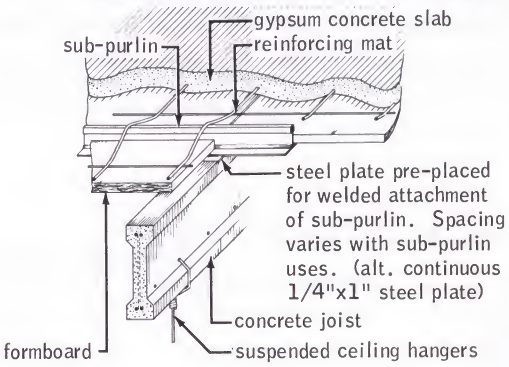




precast concrete member system



roof attachment to concrete joists



specifications

notes to architect

1. *Formboards should always be stored in a dry place. The normal moisture from a gypsum concrete slab has no effect on the performance of the formboards. However, soaking of the formboard prior to the pouring of the slab can result in excessive deflection. The roof covering should be applied as soon as possible after erection to protect the construction from precipitation. Discoloration or staining of the formboard may occur if subjected to prolonged exposure to moisture. If staining will be objectionable, the formboard may be painted; see recommendations below.*

2. Drying—*Gypsum concrete roof slabs dry out from the underside (through the formboard). Adequate heat and ventilation below the slab are required to permit the escape of this moisture. In buildings without windows or with fixed windows, adequate mechanical (forced) ventilation is required to remove all construction moisture. Gypsum concrete used as a drainage fill over concrete slabs, steel decks and other decks of low permeability must have metal roof vents installed atop fill; see recommendations below.*

3. Ventilation *should be provided for any plenum or joist space between all roof deck and ceiling constructions. The venting of enclosed air spaces should be accomplished by natural or artificial means, both during and after construction of the building. Such venting accomplished by roof vents or soffit louvers to the* *outside does not appreciably affect plenum or interior temperatures. Consult the Heating, Ventilating & Air Conditioning Guide, latest edition, published by the American Society of Heating, Refrigerating & Air Conditioning Engineers, for data on ventilating attic spaces and location of vapor barriers.*

All gypsum concrete drainage slope fills applied over unvented roof decks and gypsum slabs over LIN-TEES must have metal roof vent installed atop fill to release expanding gases and vapors. Vents should be as manufactured by O. O. McKinley Co. or equal. One vent with 6″ minimum stack diameter should be used for venting each: 1,000 sq. ft. of fill, 2″ to 4″ thick; 750 sq. ft. of fill, 4″ to 6″ thick; and 500 sq. ft. of fill, 6″ to 8″ thick. On small areas or over LIN-TEES, at least two vents should be used. Space beneath roof vent should be void of fill down to the structural deck or roof insulation. Vents may be removed after a period of 18 months if inspection reveals the fill has dried sufficiently and the roofing has performed satisfactorily.

4. Decorating—*Gypsum roof decks provide a presentable undersurface that usually does not require further decorating. Where the formboard is to be left exposed and appearance of the formboard is critical, further decoration may be necessary.*

When decoration is desired, painting should not be done until the slab is thoroughly dry. Before painting, the slab should be checked for dryness throughout its entire thickness. An electric type moisture meter can be used if contacts are driven well into interior of slab. Exposed metal, such as sub-purlin flanges, should be protected with USG Metal Coat Zinc Chromate Primer before finish coats are applied.

For SHEETROCK Formboards, a breather type paint such as TAL Latex Wall Paint is recommended, applied by brushing, rolling or spraying. A fungicide must be added to the TAL Latex Paint. For FIRECODE Mineral Fiber Formboard, use 1 or 2 coats of TAL Alkyd Flat Paint with fungicide added. GRAND PRIZE Latex House Paint is recommended on asbestos cement formboard, and does not require additional inhibitor. For fungicides in other paints, check manufacturer's specific recommendation. If surface damage defaces painted formboard, patch with DURABOND Paste Spackling Putty and paint (per instructions above) to restore original appearance. See U.S.G. Paint Products Folder SA-933 for paint specifications.

5. Expansion and Contraction—*PYROFILL and THERMOFILL Gypsum Concrete roof decks, like all roof decks, are subject to expansion and contraction due to temperature changes. Bulb tees welded to steel framing limit slab movement that would exert itself at right angles to the direction of the bulb tees. The following is suggested as a guide:*

a. *Provide expansion joints in the deck or drainage fill and the roofing wherever they are provided in the main structure.*

b. *Long narrow buildings should have expansion joints through the deck and the supporting structure spaced not more than 200 ft. apart.*

c. *Wings of "L", "U" and "T"-shaped buildings should be separated with expansion joints.*

d. *A mineral fiber filler strip should be installed at all structural roof penetrations and at walls crossing the ends of sub-purlins. See details on pages 10 and 11; note seismic design recommendations.*

To resolve specific problems, the coefficients of linear expansion should be considered. They are: for gypsum concrete, .0000085 in./in./F°; for steel, .0000065 in./in./F°. See Steel Construction Manual of the A.I.S.C., for method of calculating expansion of bodies by heat.

6. Uplift—*All roof decks are subject to uplift forces and must be anchored to supports to resist this uplift. In developing adequate resistance, the total dead load of the roof deck can be considered as part of the total resistance. In laboratory tests, PYROFILL Gypsum Concrete roof decks, using steel rails or bulb tee sub-purlins welded to the steel framing, have an average uplift resistance equivalent to more than 125 lbs. per sq. ft. Reference: Armour Research Foundation Test M1068.*

7. Roofing—*Once PYROFILL and THERMOFILL have set, the complete built-up roof covering should be installed as soon as practical but not later than two days after pouring to protect the fill from excessive wetting from rain or snow and to develop optimum nail holding power. For built-up roofing application direct to fill, a min. 40-lb. coated base sheet, or equal, nailed dry is preferred for the first ply. Drive nails into wet slab as soon as possible; rusting increases holding power. See table, page 9, for nail-holding values.*

The provision in this specification for a meeting between general, roof deck and roofing contractors to schedule the work should also be included in the roofing specification.

8. Heavy Loads—*Although the reinforced PYROFILL gypsum deck slab will carry loads in excess of 100 lbs. per sq. ft. with an adequate safety factor, the sub-purlins or bar joists govern the safe load limit. All superimposed concentrated loads, such as flagpole bases, water tanks and ventilating fans, must be directly or indirectly supported on steel framing, not on the gypsum slab.*

9. Steep Roofs—*PYROFILL and THERMOFILL Gypsum Concrete roof slabs are designed to receive built-up roof coverings. On steep roofs, where slate, ceramic tile or rigid type shingle roof coverings are required, the use of USG Metal Edge Gypsum Plank is recommended (see U.S.G. Folder SA-306).*

10. Suspended Ceilings—*Suspended ceilings under gypsum roof decks should be hung from the structural steel frame. If they are hung from the roof deck, the hangers should be attached to the sub-purlins, never to the gypsum slab alone. When hung from the sub-purlins, the sub-purlins must be capable of supporting the total weight including the ceiling load with a resultant deflection not to exceed 1/360 of their span. Attachment hangers and channel grillage are not furnished by the U.S.G. Roof Deck Contractor. See U.S.G. System Folders in this series for descriptions and details of ceiling assemblies.*

11. U.S.G. Certified Roof Decks—*United States Gypsum will, upon request, certify PYROFILL and THERMOFILL Gypsum Concrete and USG Formboards when used together in a roof deck. Specimens of the fill are taken during application and tested at the factory for dry density and compressive strength in accordance with ASTM C472. After completion of testing and the job, U.S.G. and the contractor issue a certificate stating the poured gypsum concrete and formboards were applied according to requirements and specifications.*

12. USG Metal Edge Gypsum Plank—*See U.S.G. System Folder SA-306 in this series for gypsum roof plank design data, application details and specifications.*

13. USG SPAN-ROCK Gypsum Roof Decks—*See U.S.G. Folder IR-564 for SPAN-ROCK Gypsum Roof Plank design data, erection details, deck installation and specifications.*

SA 305 U.S.G. Gypsum Roof Decks

Part 1: general

1.1 scope—*Specify as required to suit project conditions.*

1.2 qualifications

Installation of poured gypsum roof deck and drainage slope fill shall be by a U.S.G.-approved roof deck contractor.

1.3 submittals

a. The roof deck contractor shall prepare and submit shop drawings before the work begins. These shop drawings shall be in agreement with poured roof deck specifications and details as provided in current U.S.G. System Folder on Gypsum Concrete Roof Systems.

b. Where Certified Roof Deck is requested, contractor shall submit to United States Gypsum roof deck specimens taken from job; these specimens shall meet standards established for a U.S.G. Certified Roof Deck.

c. Prior to pouring gypsum deck, representatives of the general contractor, roof deck contractor and roofing contractor shall meet and agree to procedures and coordination of operations to insure that decking is roofed within 48 hours after pouring.

1.4 delivery and storage of materials

All materials shall be delivered in their original unopened packages or bundles and stored off the ground and in a place providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.5 environmental conditions

a. Ventilation shall be provided for any plenum or joist space between roof deck and ceiling assemblies. The venting of enclosed air spaces shall be accomplished by natural or artificial means, both during and after construction of the building.

b. Surfaces to receive gypsum concrete drainage slope fill shall be dry and free of frost and ice.

Part 2: products

2.1 sub-purlins: (USG Sub-purlin 20) (USG Sub-purlin 18) (USG Sub-purlin 16) (bulb tees produced from prime billet steel or rail steel ASTM A499) (Keydeck Truss Tees) cleaned and painted with one coat rust-resistant primer.

2.2 cross tees: 1¼″ x ½″ x 0.023″ thick sheet metal, hot rolled or formed and (painted) (galvanized).

2.3 permanent formboards (select as required):

a. Sheetrock Formboard, ½″ thick, 32″ wide, treated, in lengths equal to main purlin spacings (12′ max.).

b. Firecode Mineral Fiber Formboard (Custom) (Economy), (¾″) (1″) (1½″) (2″) thick by (24″) (32″) wide (select lengths from table, page 5).

c. Asbestos Cement Formboard, ¼″x32″x48″.

2.4 reinforcing mesh: 48-1214 galvanized steel, welded wire mesh or Keydeck galvanized steel, woven wire mesh. Effective cross-sectional area of mesh at right angles to sub-purlins shall be not less than 0.026 sq. in. per ft. of mesh width.

2.5 gypsum concrete: (Pyrofill) (Thermofill) mill-formulated, composed of calcined gypsum and aggregates to comply with ANSI A59.1-1968 and ASTM C317-64 (1970) standards.

2.6 water: Potable and not contain impurities that affect the setting of gypsum.

2.7 mixes: Gypsum concrete shall be mixed with clean water only, using (8½ gallons per 80 lbs. Pyrofill Concrete) (8 gallons per 67 lbs. Thermofill Concrete).

Part 3: execution

3.1 condition of surfaces

Prior to drainage fill application, contractor shall examine thoroughly all surfaces to receive fill. The contractor shall report to the architect or owner's agent in writing any defects considered detrimental to proper application of fill so defects can be remedied before fill is applied.

3.2 sub-purlin installation

Place and weld each sub-purlin to main purlins at each contact point. Attach USG Sub-purlins with ⅜″ welds through web and flanges. For bulb tees and truss tees, use fillet welds ½″ min. length placed on alternate sides of sub-purlins where accessible. All end joints are to bear on roof supports (stagger line of end joints).

3.3 formboard installation

Place formboards on sub-purlin flanges with all end or cross-joints supported, forms to fit neatly on all four edges. Cut forms to fit at walls, curves and openings as required. Install cross tees to support end joints of square-edge formboards not supported by roof framing. Lay no more formboard than can be covered by completed slab on same day.

3.4 reinforcement placement

Place reinforcing mesh with heaviest wires at right angles to sub-purlins. If Keydeck is used, place 16-ga. wires at right angles to sub-purlins. Lap mesh ends at least 6″; do not lap sides of mesh. For fire-rated assemblies, lap mesh sides (4″) (6″). Cut mesh to fit at wall, curbs and openings and carry mesh into all areas where gypsum concrete is poured.

3.5 gypsum concrete deck installation

Mix gypsum concrete and pour to minimum depth of 2″ over formboards, ¼″ over sub-purlins. Screed all surfaces to a smooth, even plane ready to receive waterproof roof covering specified in another section. After pouring, leave roof deck free and clean for other trades.

3.6 drainage slope fill installation

Mix gypsum concrete fill and pour over deck or roof insulation to the required thicknesses shown on the drawings. Screed all surfaces to a smooth, even plane ready to receive roof covering. Install mineral fiber filler strips at all structural roof penetrations and waxed fiberboard cylinders or mineral fiber plugs at roof vent locations as shown on the drawings. Pour cants and curbs as shown or required. After pouring, remove fiberboard cylinders and plugs; leave roof deck free and clean for other trades.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, PYROFILL, THERMOFILL, SHEETROCK, FIRECODE, AIRSON, ACOUSTONE, AURATONE, DURABOND, GRAND PRIZE, SPAN-ROCK, TAL.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606
SA-305/USG/1-77

description and utility

GRATE-X Grating is a heavy-duty expanded metal, produced from carbon steel sheet and plate. It contains no joints or welds; each sheet is a single piece of sturdy steel.

Structurally stronger than the original sheet, yet lightweight, GRATE-X Expanded Metal Grating is the ideal walkway and platform floor for light to heavy pedestrian loads. The Selection Guide on page 2 indicates the load/span combinations that may be accommodated with less than ¼″ deflection considered the maximum deflection to afford pedestrian comfort. U.S.G. test data confirms that greater loads may be safely accommodated if the amount of deflection is not critical.

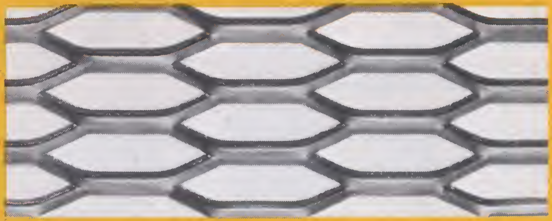
Low Cost—A cost-conscious engineer is always wary of over-design. It is frequently more economical to build walkways and platforms with GRATE-X than with other types of steel grating. Savings of up to 50% are not unusual. The reduction in dead weight, afforded by the use of GRATE-X Grating, is also a plus factor in the design of large structures.

Safety—Most companies place safety ahead of all other aspects of plant operation. For this reason the plant engineer or plant designer is always looking for ways to improve *safety performance* of an installation. GRATE-X provides an excellent *slip-resistant* walking surface; helps meet OSHA requirements. Safe, sure footing is especially important above ground level.

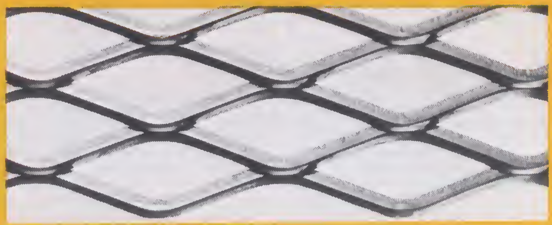
The high percent of open area, characteristic of GRATE-X, allows snow, water and oil to drain off easily, thus maintaining the slip-resistant surface. The open area also allows excellent passage of heat and light, and contributes to walkway cleanliness. Where maintenance and safety are important considerations, these features are outstanding.

Handling and Job Fabrication—*Convenient sheet sizes* and light weight make GRATE-X a favorite of steel workers. Job cutting and fitting is simply done by one or two men with standard cutting and welding equipment. The convenient sheet sizes make it possible to move GRATE-X Grating into semi-finished structures for installation on walkways and platforms even though the roof of the structure has been completed.

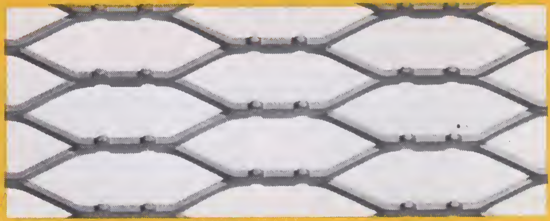
Federal Specifications—GRATE-X meets all requirements of Military Specifications MIL-M-17194C (Metal, Expanded, Steel) and MIL-G-18015 (Ships) (Gratings, Metal, other than Bar Type), and the deflection requirements of Federal Specification RR-G-1602.



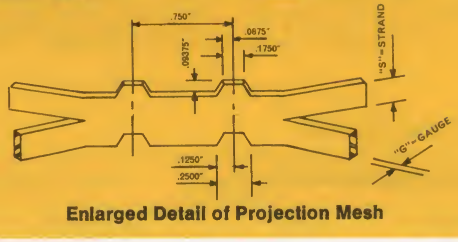
Standard GRATE-X Grating



Short Bond GRATE-X Grating



Projection Mesh



Enlarged Detail of Projection Mesh

types and functions

1. Carbon Steel GRATE-X Grating is manufactured in two patterns: **Standard GRATE-X** available in 3.0, 4.0, 5.0, 6.25 and 7.0-lb. styles; **Short Bond GRATE-X** available in 3.14 and 4.27-lb. styles. **Flattened GRATE-X** is regular GRATE-X that has been cold-rolled to a smooth surface; available in four styles (see product data table).

2. Aluminum GRATE-X Grating is the same as Standard GRATE-X but is made from aluminum alloy 5052-H32. Available in 2.0-lb. style, it offers the combined advantages of aluminum and expanded metal grating. Specific advantages are:

Economy—Light weight and high strength per pound provide a highly economical open type metal flooring.

Corrosion Resistance—Offers excellent resistance to weathering and industrial atmospheres without painting.

Non-sparking, Non-magnetic, Non-toxic—Ideal for use in explosive atmospheres and food processing plants.

3. Carbon Steel Projection Mesh is a uniquely designed expanded metal with small tooth-like projections on the upper surface of the mesh. The projections provide an excellent non-slip surface. Available in 1.87-lb. style suitable for light to moderate loads on spans of 6″ to 24″, it is excellent for industrial platforms, maintenance stands, and stair treads where maximum safety is required.

style designation	weight—lb. per 100 sq. ft.	diamond size—in. (S.W.D. x L.W.D.)	opening size—in. (S.W.O. x L.W.O.)	strand size—in. (width x thickness)	depth —inches	percent open area	standard sheet size—ft. width (S.W.D.) x length (L.W.D.)
Carbon Steel GRATE-X							
3.0 lb.*	300	1.33 x 5.33	.95 x 3.50	.264 x .183	9/16	60	4 x 8, 6 x 8, 4 x 10, 6 x 10, 10 x 6
3.14 lb.*	314	2.00 x 6.00	1.63 x 4.88	.312 x .250	11/16	69	4 x 8, 4 x 10, 6 x 10, 10 x 6
4.0 lb.*	400	1.33 x 5.33	.83 x 3.30	.300 x .215	5/8	62	4 x 8, 5 x 8, 6 x 8, 4 x 10, 5 x 10, 6 x 10, 10 x 6
4.27 lb.*	427	1.41 x 4.00	1.00 x 2.88	.300 x .250	5/8	58	4 x 8, 6 x 8, 4 x 10, 6 x 10, 10 x 6
5.0 lb.*	500	1.33 x 5.33	.76 x 3.20	.331 x .250	11/16	57	4 x 8, 5 x 8, 4 x 10, 5 x 10, 10 x 6
6.25 lb.	625	1.41 x 5.33	.75 x 3.10	.350 x .312	3/4	53	4 x 8, 6 x 8
7.0 lb.	700	1.41 x 5.33	.69 x 3.05	.391 x .312	3/4	49	4 x 8
Carbon Steel Flattened GRATE-X							
2.8 lb.	280	1.33 x 5.67	.81 x 4.00	.285 x .160	.160	55	4 x 8
3.75 lb.	375	1.33 x 5.67	.81 x 4.00	.320 x .190	.190	50	4 x 10
2.95 lb.	295	2.00 x 6.38	1.31 x 5.50	.340 x .220	.220	64	4 x 8
4.02 lb.	402	1.41 x 4.25	.75 x 3.50	.315 x .210	.210	53	4 x 8
Aluminum GRATE-X—Type 5052							
2.0 lb.	200	1.33 x 5.33	.61 x 3.20	.387 x .250	3/4	46	4 x 8, 5 x 10
Carbon Steel Projection Mesh							
1.87 lb.	187	1.13 x 5.00	.88 x 3.19	.187 x .134	7/16	67	4 x 8′4″, 6 x 10

*Also available 10′ S.W.D. x 2′, 2′6″, 3′ L.W.D.

selection guide

Determine clear span and loading, then select appropriate style of GRATE-X Grating from tables below. Style shown will provide ¼″ maximum deflection recommended for normal pedestrian comfort with a safety factor of either 2/3 proportional limit or ½ ultimate load, whichever is less. Data based on tests conducted by U.S.G. Research Center.

concentrated loading

Carbon Steel GRATE-X

concentrated load (lb. per foot of width)	clear span									
	18″	24″	30″	36″	42″	48″	54″	60″	66″	72″
50	3.0 3.14	3.0 3.14	3.0 3.14	3.0 3.14	3.0 3.14	4.0 4.27	5.0 6.25	6.25 7.0	6.25 7.0	7.0
100	3.0 3.14	3.0 3.14	3.0 3.14	3.0 3.14	4.0 4.27	5.0 6.25	7.0			
150	3.0 3.14	3.0 3.14	3.0 3.14	5.0 6.25	5.0 6.25	7.0	7.0			
200	3.0 3.14	3.0 3.14	4.0 4.27	5.0 6.25	6.25 7.0	7.0				
250	3.0 3.14	3.0 3.14	4.0 4.27	6.25 7.0	7.0					
300	3.0 3.14	4.0 4.27	5.0 6.25	7.0						
350	3.0 3.14	4.0 4.27	6.25 7.0	7.0						
400	3.0 3.14	4.0 4.27	6.25 7.0							

Aluminum GRATE-X

concentrated load (lb. per foot of width)	clear span									
	12″	18″	24″	30″	36″					
50	2.0	2.0	2.0	2.0	2.0					
100	2.0	2.0	2.0	2.0	2.0					
150	2.0	2.0	2.0	2.0						
200	2.0	2.0	2.0							

Carbon Steel Projection Mesh

50	1.87	1.87	1.87							
100	1.87	1.87								
150	1.87	1.87								
200	1.87									

uniform loading

Carbon Steel GRATE-X

uniform load (lb. per sq. ft.)	clear span				
	24″	30″	36″	42″	48″
50	3.0 3.14	3.0 3.14	3.0 3.14	4.0 5.0	6.25 7.0
100	3.0 3.14	3.0 3.14	5.0 6.25	7.0	
150	3.0 3.14	4.0 5.0	6.25 7.0		
200	3.0 3.14	5.0 6.25	6.25		
250	3.0 3.14	6.25 7.0	6.25		
300	4.0 4.27	6.25 7.0			
350	5.0	7.0			
400	5.0				

Aluminum GRATE-X

uniform load (lb. per sq. ft.)	clear span				
	12″	18″	24″	30″	36″
50	2.0	2.0	2.0	2.0	2.0
100	2.0	2.0	2.0	2.0	2.0
150	2.0	2.0	2.0		
200	2.0	2.0	2.0		

Carbon Steel Projection Mesh

50	1.87	1.87	1.87		
100	1.87	1.87	1.87		
150	1.87	1.87			
200	1.87	1.87			

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installation recommendations

1. GRATE-X Grating has a "top" and "bottom" side, as shown in Diagram 5, below and should be installed with the straight edge up for greater surface contact.

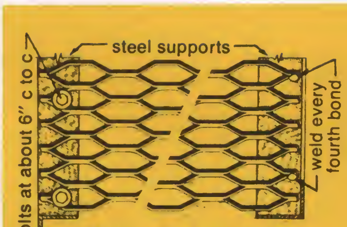
2. The slope of the bonds (see Diagram 4) should always be in the same direction on a given platform or walkway for neatness and uniformity.

3. GRATE-X should always be placed so that the long direction of the diamond openings is perpendicular to structural supports, and the ends should always bear on, and be fastened to, structural supports as in Diagrams 1 and 2. Fastening may be by welding or bolting every fourth bond, or approximately every 6".

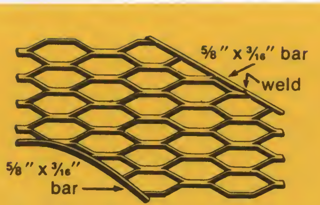
4. The sides of adjacent sheets do not require structural supports when welded as in Diagrams 6 and 7.

5. All diagonal or circular cut exposed edges should be banded with a bar roughly equal to the over-all grating thickness, welded at contact points. See Diagram 3.

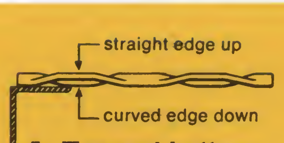
6. Diagram 8 illustrates the recommended method for covering cutouts with a separate piece of grating.



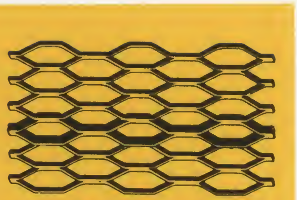
1. Method of attaching GRATE-X to supports.



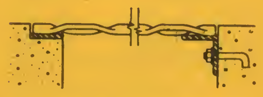
3. GRATE-X banded at diagonal / circular cuts.



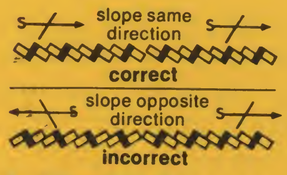
5. Top and bottom sides of GRATE-X.



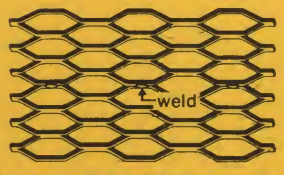
7. Join GRATE-X sheets by lapping and welding.



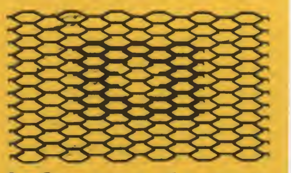
2. GRATE-X covering over trenches, etc.



4. Direction of placing GRATE-X.



6. Join GRATE-X sheets by butting and welding.



8. Covering of cutouts in GRATE-X.

U.S.G. project fabrication service

For installations where stock size sheets cannot be used, United States Gypsum estimates, quotes, details and fabricates to your requirements; supplies GRATE-X Grating with banding and toe plates installed where needed; applies rust-preventive primer or furnishes hot-dip galvanizing on request . . . welds tags to every section of GRATE-X for easy identification to prevent errors. This service is available through your U.S.G. distributor.

stair treads

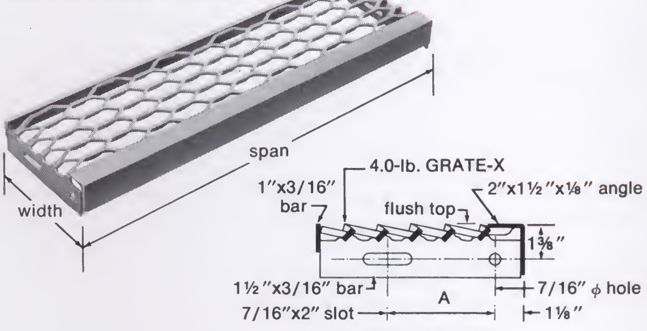
Fabricated from GRATE-X Grating and simple steel sections, U.S.G. Stair Treads are strong, durable, and provide a safe, sure footing. They are self-cleaning and easily maintained. Ideal for industrial stairs, either interior or exterior; quickly installed by simple attachment with bolts and nuts to standard channel stringers. Shipped completely fabricated, primed and ready to install. Attachment bolts not furnished.

Stair treads are available in popular sizes or produced to order in ½" length increments up to and including 48". Manufactured in two types:

GRATE-X Stair Treads—sturdy welded assembly available with abrasive or checkerplate nosing on special order. Sizes available on order: 8¼"x24", 8¼"x30", 9⅝"x30", 9⅝"x36".

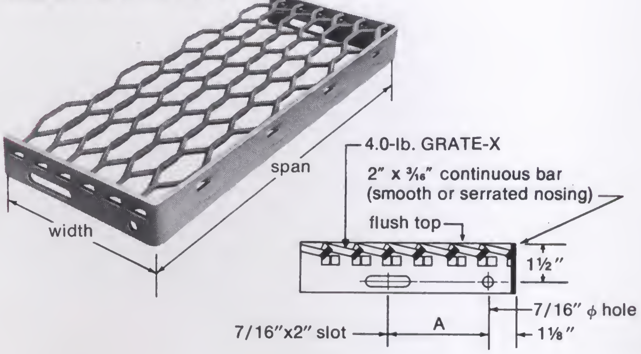
TREAD-X™ Stair Treads—unique design provides economically priced tread. Sizes available on order: 8½"x24", 8½"x30", 9¾"x30", 9¾"x36". Also available with serrated front bar.

GRATE-X Stair Treads



Section Thru Tread

TREAD-X Stair Treads



Section Thru Tread

GRATE-X Expanded Metal Grating

stair tread product data

width	dimension "A"	weight in lb.	
		base	per 1″
GRATE-X tread			
5⅝″	2½″	.90	.32
7″	2½″	1.12	.36
8¼″	4½″	1.30	.38
9⅝″	6″	1.53	.42
11″	7″	1.75	.46
TREAD-X tread			
5¾″	3″	1.11	.26
7⅛″	3″	1.39	.30
8½″	5¾″	1.60	.33
9¾″	5¾″	1.90	.37
11¼″	8″	2.15	.41

safe concentrated loads(1)—lb.

length	GRATE-X tread	TREAD-X tread
24″	780	600
30″	625	480
36″	520	400
42″	445	340
48″	390	300

(1) Load limits are approximately the same for treads of the same length, regardless of width.

specifications

scope—GRATE-X Expanded Metal Grating shall be installed for all walkways and other areas where shown on drawings.

material—GRATE-X Expanded Metal Grating shall weigh (specify weight per sq. ft. from table, page 2).

(For steel) The steel used in manufacture shall comply with ASTM designation A283-75.

(For aluminum) The aluminum used in manufacture shall be 5052-H32 alloy.

erection—Units of GRATE-X Grating shall be installed with straight edge of bond up and shall be so placed that the direction of the long way of the diamond parallels the direction of the span. Attachment to framing shall be by welding at 6″ intervals. Edges parallel to long way of diamonds shall be butted and welded on every second bond. Individual pieces of grating shall be placed in such a manner that the diamonds of one piece are aligned with those of adjacent pieces.

ordering information

1. Order from your local U.S.G. Expanded Metal Distributor.

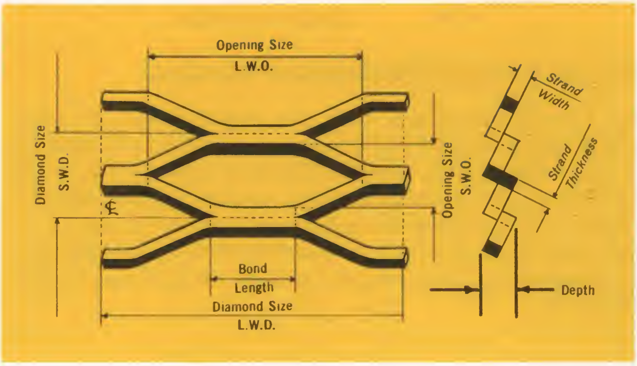
2. Always specify the amount, style and sheet size, as in the following examples:
20 pcs., 5.0# GRATE-X, 4′ x 8′
5 pcs., 2.0# Alum. GRATE-X, 5′ x 10′

Note: *The sheet size S.W.D. (short way of diamond) is always specified and the sheet size L.W.D. (long way of diamond) is specified second, i.e., S.W.D. x L.W.D.*

3. If special sheet sizes are required, state exact sheet size and type of shearing wanted, or dimensional tolerance allowed. GRATE-X is normally furnished bond-sheared on the first bond over the specified dimension (both S.W.D. and L.W.D.); however, it can be furnished random-sheared to a closer tolerance if required.

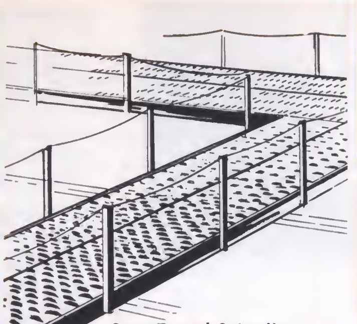
Standard tolerances on special sheet sizes are as follows:
Bond Sheared Sheets—0″, +½ diamond
Random Sheared Sheets ±⅛″

4. If your GRATE-X requirements involve walkways and platform areas that cannot be specified in simple sheet sizes, contact your U.S.G. Sales Representative for assistance.

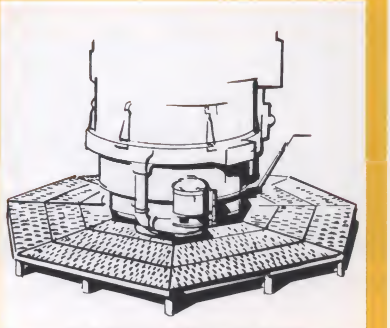


UNITED STATES GYPSUM
BUILDING AMERICA
Metal Products Division: 101 South Wacker Drive, Chicago, Ill. 60606
Printed in U.S.A.

GRIP STRUT® Safety Grating



Sure-Footed Catwalks



Self-Cleaning Work Platforms

Safer Aircraft Maintenance

Strong Grill Guards

description and utility

Grip Strut Safety Grating has been engineered to provide maximum safety underfoot, exceptional load-carrying capacity for intermediate span lengths, and lightweight, self-framing, one-piece construction. As such it helps meet OSHA standards for walking-working surfaces and is ideally suited for all types of work platforms, open flooring, catwalks, balconies, storage areas, walkways and stair treads. It has been extensively used by the aircraft, food processing, oil and automobile industries for these and other applications.

Grip Strut, a unique material, has reticulated and formed metal cross struts arranged in a diamond pattern with integrally formed channels at the edges. The cross struts form a slip-resistant, resilient walking surface with sufficient open area to provide ample passage of light and air. Other features:

High Strength—lightweight, one-piece construction develops strength from the section and a high load capacity per pound. Some styles are suitable for spans up to 12 ft.

Safety Surface—the unique surface pattern makes Grip Strut Safety Grating slip-resistant in all directions.

Easily Installed—most sections can be handled by one man. Cuts readily—is rapidly welded, bolted or clamped into place.

Large Open Area—permits free flow of air, heat and light. Often eliminates need for additional sprinklers under catwalks and platforms.

Economical—low in initial cost. Quickly installed, self-cleaning. Standard galvanized finish minimizes maintenance. Plain finish is easily painted for low maintenance costs. Light weight with high strength can result in structural steel savings.

types and functions

Grip Strut Gratings are manufactured in two basic types and in various channel depths and gauges to accommodate design loads needed for pedestrian traffic or those encountered in light storage or equipment installations (see safe load table). Grip Strut is produced in carbon steel, galvanized steel, aluminum and stainless steel in widths from 4¾ to 24 in. and lengths up to 14 ft. Grip Strut Grating products include:

1. Grip Strut Safety Grating has a highly slip-resistant serrated surface for use where safety underfoot is a prime requirement. Material meets anti-slip values set forth in Fed. Spec. RR-G-1602. Classified by Underwriters Laboratories Inc. for slip resistance only; see UL Index of Classified Products.

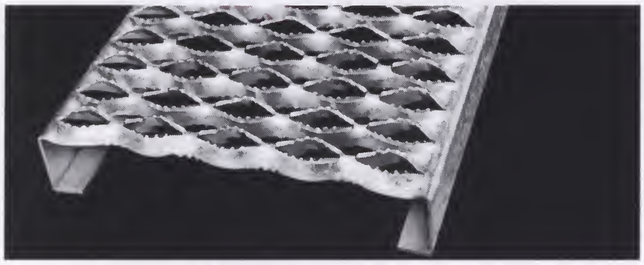
2. Grip Strut Safety Grating Walkway, in 24-in. width with integral Z-flanges, meets OSHA requirements for toeboards on elevated runways. These 4½-in. high flanges help prevent tools and parts from falling over the edges and make the grating ideal for conveyor walkways. This exceptionally strong walkway material is produced in two steel gauges: with spans up to 12 ft., concentrated pedestrian load capacity is 400 lb. for 12-ga., 300 lb. for 14-ga.

3. Grip Strut Non-serrated Grating provides a high-strength, lightweight pedestrian trafficway, platform or storage deck.

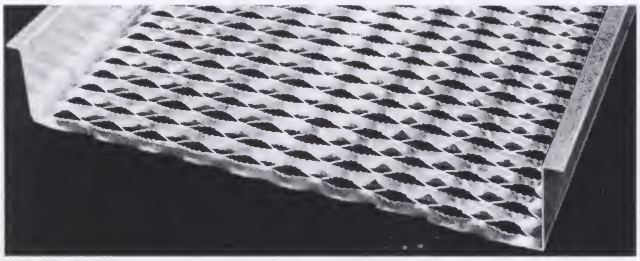
4. Grip Strut Safety Treads are ready-to-install units fabricated from Grip Strut Safety Grating. Standard Safety Stair Treads are available in 4¾, 7, 9½ and 11¾-in. widths. Abrasive Nosing Safety Treads are available in 8⅛ and 10½-in. widths. Standard lengths: 24, 30, 36, and 48-in.; special lengths available on order.

Grip Strut Stair Treads also are available fabricated from Non-serrated Grating.

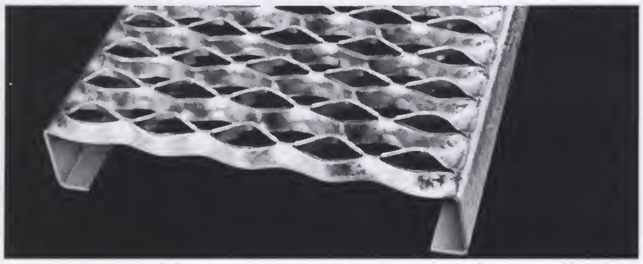
UNITED STATES GYPSUM
1977-1
5P
MISCELLANEOUS METAL
gratings



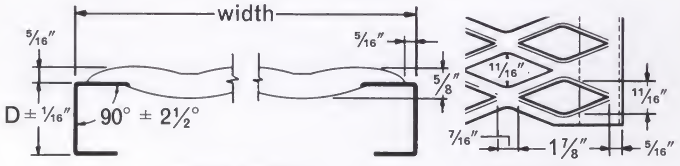
GRIP STRUT Safety Grating



GRIP STRUT Safety Grating Walkway

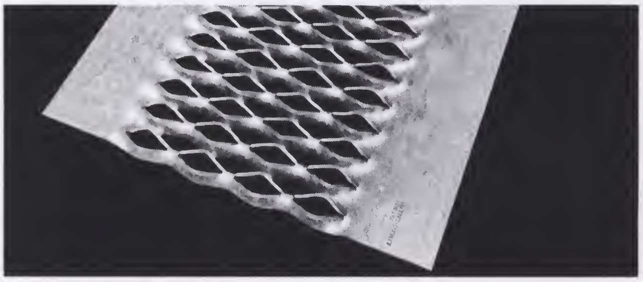


GRIP STRUT Non-serrated Grating

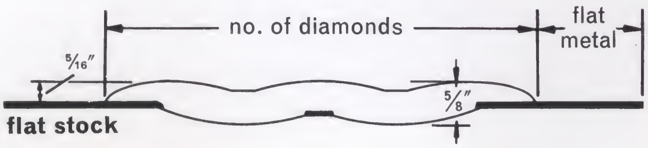


cross section plan view

safety or non-serrated grating



GRIP STRUT Grating Flat Stock



product data

available metals

a. carbon steel—hot rolled, pickled and oiled.

b. galvanized steel—hot dipped mill-galvanized steel fabricated after galvanizing. In use the edges are protected by the electrochemical action of the zinc.

c. stainless steel—alloy type 304, 18-8 (18 chrome, 8 nickel) austenitic stainless. This alloy offers excellent corrosion resistance, high strength and good weldability.

d. aluminum—alloy 5052-H32. In addition to light weight this alloy offers strength and corrosion resistance.

finishes

Standard: galvanized steel or carbon steel painted with protective aluminum coating. Unpainted material is lightly oiled.

lengths—metal gratings

10 and 12 ft. in all materials and sizes.

grating—styles available

weights and dimensions

gauge & type	channel height (1) widths→	weight—lb. per lin. ft. 4¾″	7″	9½″	11¾″	18¾″	24″
14-ga. steel	1½″	2.3	3.0	3.6	4.2	6.1	—
	2″	2.6	3.2	3.8	4.4	6.3	7.4
	2½″	2.8	3.5	4.1	4.7	6.6	—
	3″	—	—	—	—	—	7.9
12-ga. steel	1½″	3.2	4.1	5.0	5.9	8.5	—
	2″	3.6	4.5	5.4	6.2	8.9	10.4
	2½″	4.0	4.9	5.7	6.6	9.2	—
	3″	—	5.2	6.1	7.0	9.6	11.1
12-ga. aluminum	2″	.94	1.15	1.38	1.59	—	—
16-ga. stls. stl.	2″	—	—	3.2	3.27	—	—

(1) Add 5⁄16″ for overall depth

flat stock—styles available

Flat Stock is available in all standard materials and sizes. The open matrix is symmetrical about the flat plane. The following table indicates the approximate dimensions of flat metal available on each side.

dimensions—steel and aluminum

matrix	flat metal each side
2-diamond	2¼″ to 3 13⁄16″
3-diamond	2⅜″ to 3⅞″
4-diamond	2⅜″ to 3⅞″
5-diamond	2⅜″ to 3⅞″
8-diamond	2⅜″ to 4″
10-diamond	3¼″ to 7⅝″

Flat Stock also can be formed to suit requirements calling for specified dimensions of flat metal on either or both sides. Special side channels or special shapes can be formed on either or both sides.

stair tread—styles available

dimensions—steel and aluminum

standard A	B	C	D	with abrasive nosing A	B	C	D
4¾″ (2 dia.)	1½″	¾″	—	—	—	—	—
	2″	1″					
7″ (3 dia.)	1½″	¾″	3⅜″	8⅛″ (3 dia.)	1½″	¾″	4½″
	2″	1″	3⅜″		2″	1″	4½″
9½″ (4 dia.)	1½″	¾″	5⅞″	10½″ (4 dia.)	1½″	¾″	6⅞″
	2″	1″	5⅞″		2″	1″	6⅞″
11¾″ (5 dia.)	1½″	¾″	8⅛″	—	—	—	—
	2″	1″	8⅛″				

Length tolerance: ±⅛″. For key to dimensions, see drawings at right.

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design data

steel—GRIP STRUT Grating—5-diamond/11¾″ width (1)

material	channel depth		span																
			2′-0″	2′-6″	3′-0″	3′-6″	4′-0″	4′-6″	5′-0″	5′-6″	6′-0″	6′-6″	7′-0″	7′-6″	8′-0″	9′-0″	10′-0″	11′-0″	12′-0″
14 ga.	1½″	**U**	536	344	240	177	136	108	88	74	62								
		D	.06	.10	.14	.20	.26	.33	.41	.50	.60								
		C	525	422	353	304	267	239	216	198	183								
		D	.05	.08	.12	.16	.21	.26	.33	.40	.48								
	2″	**U**	890	571	397	293	225	178	145	120	102	87	76	66	59	47			
		D	.06	.09	.13	.17	.23	.29	.36	.43	.52	.61	.71	.83	.95	1.21			
		C	707	699	584	502	440	393	355	324	299	277	259	243	230	207			
		D	.04	.07	.10	.14	.18	.23	.29	.35	.42	.49	.57	.66	.76	.97			
	2½″	**U**	1021	655	456	336	258	204	166	138	116	100	86	76	67	54	44		
		D	.04	.06	.08	.11	.14	.18	.23	.28	.33	.39	.45	.52	.60	.77	.96		
		C	707	707	669	575	505	450	407	371	342	317	296	278	262	236	216		
		D	.02	.04	.06	.09	.12	.15	.18	.22	.26	.31	.36	.42	.48	.62	.77		
12 ga.	1½″	**U**	710	456	318	235	181	144	117	98	83	71	62	55	49				
		D	.07	.11	.15	.21	.28	.35	.44	.53	.64	.76	.89	1.03	1.18				
		C	695	558	467	402	354	317	287	263	244	227	213	201	190				
		D	.05	.08	.12	.17	.22	.28	.35	.43	.51	.60	.71	.82	.95				
	2″	**U**	1131	725	505	372	286	227	185	154	130	111	97	85	75	60	50	42	
		D	.05	.08	.11	.16	.20	.26	.32	.39	.47	.56	.65	.75	.86	1.11	1.39	1.70	
		C	1107	888	742	638	561	501	453	414	382	355	332	312	295	266	243	224	
		D	.04	.06	.09	.12	.16	.21	.26	.31	.38	.44	.52	.60	.69	.89	1.11	1.36	
	2½″	**U**	1691	1083	753	554	425	337	273	226	191	163	141	123	109	87	71	59	50
		D	.04	.06	.09	.13	.17	.21	.26	.32	.38	.45	.52	.60	.68	.87	1.09	1.33	1.60
		C	1115	1115	1106	950	833	742	669	610	561	519	484	453	426	382	347	319	295
		D	.02	.04	.07	.10	.13	.17	.21	.25	.30	.36	.41	.48	.55	.70	.87	1.06	1.28
	3″	**U**	2138	1370	952	701	537	425	345	286	241	206	178	155	137	109	89	74	63
		D	.04	.06	.08	.11	.14	.18	.22	.27	.32	.38	.44	.51	.58	.74	.93	1.13	1.36
		C	1115	1115	1115	1115	1052	937	845	770	707	654	609	570	537	480	436	399	369
		D	.02	.03	.05	.08	.11	.15	.18	.22	.26	.31	.36	.41	.47	.60	.74	.90	1.09

stainless steel—GRIP STRUT Grating—5-diamond/11¾″ width (1)

material	channel depth		span									
			2′-0″	2′-6″	3′-0″	3′-6″	4′-0″	4′-6″	5′-0″	5′-6″	6′-0″	6′-6″
16 ga. Type 304	2″	**U**	583	374	261	192	148	118	96	80	68	58
		D	.05	.08	.11	.16	.20	.26	.32	.39	.47	.56
		C	464	458	383	330	290	259	235	215	199	185
		D	.03	.06	.09	.12	.16	.21	.26	.32	.38	.45

(1) Approx. conversion factors for other sizes (uniform load only)

width	4¾″	7″	9½″	18¾″	24″
factor	2.53	1.71	1.26	0.64	0.49

For load data on other sizes, see GRIP STRUT Grating Catalog G-60.

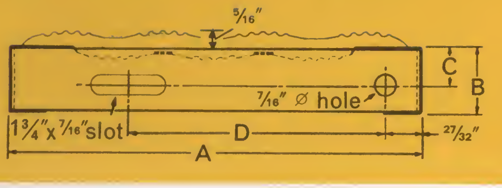
aluminum—GRIP STRUT Grating—5-diamond/11¾″ width (1)

material	channel depth		span							
			2′-0″	2′-6″	3′-0″	3′-6″	4′-0″	4′-6″	5′-0″	5′-6″
.080″ Alloy 5052	2″	**U**	560	359	250	184	141	112	91	76
		D	.09	.14	.20	.28	.36	.46	.58	.70
		C	484	439	367	316	277	247	223	204
		D	.07	.11	.16	.22	.29	.37	.46	.56

U—uniform load, lb./sq. ft.; C—concentrated load, lb.; D—deflection in inches.
The above safe loads were determined in accordance with A.I.S.I. Light Gauge Cold Formed Steel Design Manual 1962, Section 6.

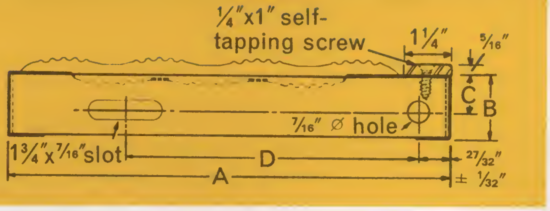
GRIP STRUT Safety Stair Tread

Abrasive Nosing GRIP STRUT Safety Stair Tread



dimensions A, B, C, & D have a tolerance ± 1/16″

treads available in safety edge as shown, or in intermediate type



GRIP STRUT Safety Grating

safe loading—Grip Strut Stair Treads

U-uniform load C-concentrated load (pounds)		2-diamond						3-diamond						4-diamond						5-diamond					
material		steel		steel		alum.		steel		steel		alum.		steel		steel		alum.		steel		steel		alum.	
gauge		14		12		.080		14		12		.080		14		12		.080		14		12		.080	
span	side channel	C	U	C	U	C	U	C	U	C	U	C	U	C	U	C	U	C	U	C	U	C	U	C	U
2′-0″	1½″	472	1191	624	1576	—	—	443	761	587	1006	—	—	435	549	595	750	—	—	425	434	563	575	—	—
	2″	783	1978	995	2513	490	1240	737	1262	936	1604	462	793	604	911	917	1158	454	574	573	721	897	916	392	454
2′-6″	1½″	378	764	500	1011	—	—	356	488	470	645	—	—	349	353	476	481	—	—	342	278	452	369	—	—
	2″	611	1268	797	1611	392	793	590	810	750	1029	371	508	578	584	734	742	364	368	566	463	719	587	356	291
3′-0″	1½″	315	532	418	703	—	—	300	340	393	450	—	—	300	245	398	335	—	—	300	194	378	258	—	—
	2″	524	882	665	1121	328	550	492	563	626	716	309	354	483	407	614	517	304	256	473	322	601	409	298	203
4′-0″	2″	394	498	501	633	245	309	372	318	472	404	233	200	364	230	463	292	230	145	356	182	454	232	225	114

Note: Steel treads—exceed concentrated and uniform live load capacities required by major building codes; intermediate stringer recommended for spans over 4 ft. Aluminum treads—exceed uniform live load capacity required by major building codes; not recommended for spans over 48 in.

specifications

Note to architect: Miniature "*Specification Drawings*" of *GRIP STRUT Grating Products, G-413, and "Design Drawings for Stair Systems", G-404, are available, at no cost, for use in design and drawing preparation. Ask your GRIP STRUT Grating distributor for them.*

scope—The contractor shall supply all labor, material and equipment to install Grip Strut Grating and Grip Strut Stair Treads, as specified, in all areas where shown on the drawings. Approved shop drawings are required before work proceeds.

grating materials—Shall be Grip Strut Grating, as manufactured by the Metal Products Division, United States Gypsum Company, with the following characteristics:

1. Type: (Grip Strut Safety Grating) (Grip Strut Safety Grating Walkway) (Grip Strut Non-serrated Grating).

2. Metal: (carbon steel) (hot dipped mill-galvanized steel) (stainless steel alloy type 304) (aluminum alloy 5052-H32).

3. Finish: (mill-galvanized before fabrication) (painted—one standard shop coat of aluminum primer) (unfinished, oiled).

4. Metal gauge: (14-ga. steel) (12-ga. steel) (16-ga. stainless steel) (.080 aluminum), (choose size from table).

5. Section width: (4¾″) (7″) (9½″) (11¾″) (18¾″) (24″), (choose size from table).

6. Channel depth: Safety Grating—(1½″) (2″) (2½″) (3″), (choose size from table); Walkway Grating—4½″.

stair tread materials—Shall be Grip Strut Grating, as manufactured by the Metal Products Division, United States Gypsum Company, with the following characteristics:

1. Type: (Grip Strut Safety Stair Tread) (Grip Strut Stair Tread), (Standard Nosing) (Abrasive Nosing).

2. Metal: (carbon steel) (hot dipped mill-galvanized steel) (stainless steel alloy type 304) (aluminum alloy 5052-H32).

3. Finish: (mill-galvanized before fabrication) (painted—one standard shop coat of aluminum primer) (unfinished, oiled).

4. Tread depth: (2 dia. 4″ wide) (3 dia. 7″ wide) (4 dia. 9½″ wide) (5 dia. 11¾″ wide), (choose size from table).

5. Channel height: (1.5″) (2.0″), (choose size from table).

6. Gauge: (14-ga. steel) (12-ga. steel) (16-ga. stainless steel) (.080 aluminum), (choose size from table).

7. Span or width of staircase: (24″) (30″) (36″) (48″), (choose size from table).

installation—Grating and stair treads shall be installed as directed by manufacturer using (welds) (bolts) (anchoring devices).

distribution

Grip Strut Safety Grating and Grip Strut Safety Stair Treads are stocked by distributors in principal cities. Consult the local classified telephone directory under Gratings—Steel Floor for qualified assistance.

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Smoother walls and stronger floors with . . .
USG® Light Steel Framing
for light commercial, single- and multi-family residential buildings

Better performance at lower cost—with rapidly installed, precision-engineered steel studs and joists.

description

USG Light Steel Framing offers lightweight, noncombustible, corrosion-resistant framing for load-bearing exterior walls, interior partitions and floor/ceilings in residential, apartment and light-commercial construction. Studs, runners and joists are channel-type sections, roll-formed from hot-dipped galvanized steel. Sections are designed for superior performance, fast assembly, ready accommodation of conduit and piping, and screw attachment of surfacing materials. Components meet functional requirements outlined below:

USG Light Steel Studs—in 12 variations for exterior walls and interior partitions, including one- and two-hour fire-rated assemblies. Patented "crow's foot" end stiffeners on some styles add end-crushing resistance. Factory-cut lengths to 25 ft.

USG Light Steel Runners—in styles to match studs, in C-channel type for floor use, and J-channel type for extra load support at the ceiling. Prepunched screw holes in flanges speed stud attachment.

USG Steel Joists—in 12 variations for floors and ceilings, including a 1-hr. fire-rated assembly. Intermediate web-stiffening ribs maximize load capacity, and web holes accommodate service lines. Custom-cut lengths to 44 ft., plus a complete line of joist accessories.

advantages

Lightweight—High strength-to-weight ratio means lighter sections, easy to handle and fast to install. Ground-level panel assembly becomes practical.

Versatile—Ideal for buildings up to three stories high.

Exclusive features—Engineered for greater loads, these special shapes in dimension-lumber depths nest with virtually no dimensional change and permit easy substitution for wood. Framing mates readily with door frames and surfacing materials. Factory-stamped size/style designation identifies each member on the job.

Superior performance—Framing is noncombustible, tested in various sound- and fire-rated assemblies, and meets model building code and HUD requirements. Design features capitalize on the superior strength, rigidity, uniform quality and dimensional stability of steel. Hot-dipped galvanizing resists rusting; damage from termites, rot or vermin is not a factor. Framing won't warp, crack or shrink, has no knots to weaken it, and provides a smooth base for surfacing materials. Nail pops are eliminated, squeaks minimized.

Low in-place cost—Installation is rapid, saving time and money. Wider 24-in. spacing cuts the number of studs and joists needed—by almost one-third as compared to the 16-in. spacing for wood framing. Custom-cut lengths eliminate scrap and expensive job-cutting. Imprinted style and color codes reduce job-site sorting. Assembly and conduit installation are speeded by factory-punched knockouts, and surfacing material attachment is simplified by wide flanges.

Reliable pricing—Market prices of steel are relatively stable, making cost estimates more reliable—and profits more consistent.

limitation

Allowable loads, spans and wall heights, framing and fastener spacing, and other limiting conditions must be adhered to for satisfactory performance.

UNITED STATES GYPSUM
1977–1

5 P LIGHTGAGE METAL FRAMING
joists, studs—load-bearing

USG Light Steel Studs

This load-bearing exterior wall framing provides interior space flexibility, and easy partition relocation during remodeling. Because of weight savings, USG Light Steel Studs permit ground-assembly of tilt-up panels, for economy of labor. Reduced dead load means structural savings as well, while the assembly's noncombustibility may reduce insurance rates.

The studs' C-channel shape permits nesting to carry greater compressive loads. Studs can be used singly, nested, and in combinations to suit wall and load conditions, or for lintels. They also can be used singly in non-load bearing curtain walls. Stud webs have 1¼-in. holes prepunched at 2-ft. intervals for speedy mechanical/electrical installation, are imprinted with style designation at like intervals, and color-coded.

physical properties

stud designation	depth (in)		weight(1) (lb/ft)	effective area(2) (sq in)	thickness(2) (in)	flange width(3) (in)	lip width (in)
	nom.	actual					
35ST8	3½	3.448	0.80	0.217	0.0284	1.606	0.500
35ST10		3.448	0.95	0.262	0.0344	1.606	0.500
35ST13		3.448	1.22	0.338	0.0449	1.606	0.500
35ST16		3.421	1.60	0.453	0.0598	1.552	0.625
35ST20		3.421	1.97	0.558	0.0747	1.552	0.625
55ST10	5½	5.448	1.20	0.335	0.0344	1.606	0.500
55ST13		5.448	1.55	0.428	0.0449	1.606	0.500
55ST16		5.421	2.02	0.587	0.0598	1.552	0.625
55ST20		5.421	2.50	0.725	0.0747	1.552	0.625
75ST13	7½	7.448	1.88	0.524	0.0449	1.606	0.500
75ST16		7.421	2.45	0.707	0.0598	1.552	0.625
75ST20		7.421	3.04	0.875	0.0747	1.552	0.625

(1) Galvanized. (2) Steel without galvanizing. (3) Narrower flange; wider flange is 1.724 in. outside width for all studs.

USG Light Steel Runners

Studs are set into runners at floor (C-channels) and ceiling (C-or J-channels). Runners reduce field-drilling by means of: (1) prepunched flange holes to guide drilling of studs for screw-attachment, (2) web knockouts allowing quick conduit pass-through. The popular 3½-in. width has web knockouts 24 in. o.c., for installation of services, and flange screw-guide holes every inch for quick stud attachment.

Studs are attached with USG Brand Screws, or welded (MIG-welded for metal up to .04 in., resistance-welded for thicker metal). Welding should be corrosion-resistant and comply with current AWS practice.

stud nomenclature	joist nomenclature
75	**115**
nom. depth 7½″	nominal depth 11½″
ST	**FJ**
stud	floor joist
20	**20**
style designator	style designator

section properties

stud designation	Q(1) (column factor)	J (in^4)	C_w (in^6)	x_o (in)	major axis			minor axis		
					I_x (in^4)	S_x (in^3)	R_x (in)	I_y (in^4)	S_y (In^3)	R_y (in)
35ST8	0.611	0.0001	0.253	1.465	0.422	0.242	1.395	0.085	0.075	0.627
35ST10	0.729	0.0001	0.301	1.463	0.506	0.291	1.391	0.101	0.088	0.620
35ST13	0.839	0.0002	0.381	1.461	0.649	0.372	1.385	0.125	0.110	0.607
35ST16	0.915	0.0006	0.580	1.566	0.835	0.478	1.358	0.167	0.151	0.606
35ST20	0.972	0.0011	0.693	1.564	1.017	0.582	1.349	0.195	0.176	0.591
55ST10	0.592	0.0001	0.791	1.227	1.469	0.535	2.094	0.119	0.094	0.595
55ST13	0.697	0.0003	1.195	1.264	1.960	0.715	2.072	0.143	0.115	0.582
55ST16	0.800	0.0007	1.751	1.355	2.455	0.894	2.044	0.194	0.160	0.582
55ST20	0.836	0.0013	2.110	1.351	3.056	1.113	2.033	0.228	0.187	0.568
75ST13	0.573	0.0004	2.008	1.066	3.986	1.063	2.758	0.162	0.121	0.557
75ST16	0.644	0.0008	2.922	1.143	5.267	1.401	2.730	0.220	0.168	0.558
75ST20	0.700	0.0016	3.526	1.138	6.467	1.720	2.718	0.260	0.198	0.545

(1) All stud elements stiffened in accordance with AISI Specifications.

interior partition stud/0-psf wind load

stud clear height spacing		allowable compressive load(2) (lb)											
		steel stud-section designation											
floor/ceiling unbraced ht(2) (ft)	spacing (in o.c.)			3½″			5½″				7½″		
		35ST8	35ST10	35ST13	35ST16	35ST20	55ST10	55ST13	55ST16	55ST20	75ST13	75ST16	75ST20
8	12, 16 or 24	2097	2967	4327	6284	8040	3296	4819	7080	9360	5070	7666	10290
9	12, 16 or 24	2047	2881	4179	6036	7694	3264	4768	6990	9232	5043	7619	10221
10	12, 16 or 24	1991	2785	4014	5758	7308	3228	4710	6888	9089	5013	7567	10143
11	12, 16 or 24	1930	2678	3831	5451	6880	3189	4646	6776	8931	4980	7509	10058
12	12, 16 or 24	1863	2562	3630	5115	6412	3145	4576	6653	8757	4943	7445	9964
14	12, 16 or 24	1711	2299	3177	4356	5354	3048	4418	6376	8366	4861	7301	9752
16	12, 16 or 24	1535	1996	2654	3480	4184	2935	4236	6055	7915	4765	7136	9507
18	12, 16 or 24	1336	1652	2111	2750	3306	2807	4030	5692	7403	4657	6948	9230
20	12, 16 or 24	1114	1337	1710	2227	2678	2664	3799	5286	6831	4537	6737	8920

(2) Studs limited by L/R of 200 (about XX axis), and laterally braced (about YY axis) with straps or facing materials.

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USG Steel Joists

Economical USG Steel Joists are suitable for either floor or roof construction. They fit readily with common wall and foundation materials, flooring and drywall ceilings. Installation is with standard hand power tools, and they are nested and boxed for stairway headers, or readily spliced for center-beam construction.

USG Steel Joists cost less than wood, since at 24 in. o.c., fewer of them carry equivalent loads of wood joists at 16 in. o.c. In addition, they install faster than wood joists. They average up to 25% lighter for the same depth, and lengths are factory-cut to eliminate field-cutting, waste and scrap-cleanup. Installation of services is through factory-punched holes in joist web, and subfloors are easily applied since joists are rarely lapped.

Steel joists are noncombustible, providing a 1-hr. rated floor/ceiling assembly in UL Design L524, using Style 725FJ13 joists at 24 in. o.c. Predictable properties of high-yield strength steel permit greater spans with known safety factors. Their dimensional stability helps prevent squeaky floors.

limitations

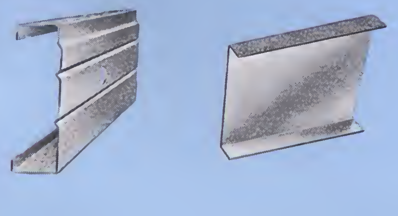
Minimum joist bearing is 1½-in. Ceramic tile applied to wood floors over steel joists must comply with current specifications of Tile Council of America. For cantilevers such as overhangs and balconies, joist size, spacing and reinforcing must be separately calculated.

accessories

USG Steel Joist Accessories include: *Header Section* (Joist Style 135FJ20) for long-span lintels and headers of to to 20 ft.; *C-closure* for joist ends; prepunched *End Clip* for screw-connections of joists; slotted *Foundation Clip* for header attachment to anchor bolts; prepunched *Joist Attachment Bracket* for attachment of joists to headers; 2-in. steel *Strap Bracing* for bridging; *Plastic Grommet* for positive electrical insulation in framing; *USG Brand Screws* in three types for electric screwgun attachment of framing components and of plywood subflooring to joists, also *DURABOND® Multi-Purpose Adhesive* for bonding subflooring to joists. *Web Stiffeners* used at end or intermediate supports are field-cut joists.

USG Light Steel Studs

USG Steel Joists



physical and section properties

joist style	depth D (in)	weight (lb/ft)†	effective area (sq in)††	I_x (in^4)	S_x (in^3)
115FJ20	11.421	4.10	1.174	18.79	3.26
95FJ20	9.421	3.56	1.025	11.62	2.44
95FJ16	9.421	2.87	0.826	9.44	1.98
925FJ20	9.171	3.50	1.006	10.80	2.33
925FJ16	9.171	2.82	0.811	8.66	1.87
75FJ20	7.421	3.03	0.875	6.47	1.72
75FJ16	7.421	2.44	0.707	5.27	1.40
75FJ13	7.448	1.87	0.524	3.99	1.06
725FJ20	7.171	2.96	0.856	5.85	1.60
725FJ16	7.171	2.38	0.692	4.70	1.28
725FJ13	7.198	1.83	0.513	3.50	0.96
55FJ10	5.448	1.20	0.335	1.47	0.54

†Galvanized. ††Without galvanizing. f_b equals 20 ksi.

maximum allowable clear span (ft.-in.)

USG joist style	joist spacing	floor loading, psf(1)					
		10 dead 30 live		10 dead 40 live		10 dead 50 live	
		1-span	2-span(2)	1-span	2-span(2)	1-span	2-span(2)
115FJ20	12	30-0	35-0	28-0	31-6	26-0	28-6
	16	27-6	28-0	24-6	27-6	22-6	25-0
	24	22-6	23-0	20-6	22-0	18-6	20-0
95FJ20	12	25-6	28-9	23-2	26-3	21-7	22-5
	16	21-2	26-2	21-2	23-10	19-9	20-4
	24	20-1	22-2	17-11	19-7	16-4	17-10
95FJ16	12	23-10	26-10	21-7	24-5	20-1	20-6
	16	21-7	24-0	19-8	21-4	18-1	18-7
	24	18-1	19-4	16-2	17-1	14-9	15-5
925FJ20	12	25-0	28-1	22-7	25-7	21-3	23-7
	16	22-8	25-6	20-6	23-3	19-2	21-5
	24	19-7	21-7	17-6	19-4	16-0	17-6
925FJ16	12	23-3	26-0	21-2	23-10	19-8	21-10
	16	21-3	23-4	19-3	20-9	17-7	18-10
	24	17-7	18-9	15-8	16-7	14-4	15-1
75FJ20	12	21-0	23-11	19-2	21-10	17-10	20-0
	16	19-2	21-10	17-6	19-10	16-2	18-4
	24	16-7	18-7	15-1	16-7	13-9	15-2
75FJ16	12	19-8	21-11	17-9	20-0	16-7	18-4
	16	17-10	20-0	16-3	18-3	15-1	16-7
	24	15-2	16-7	13-7	14-9	12-5	13-5
75FJ13	12	17-10	20-1	16-3	17-10	15-1	15-11
	16	16-3	17-3	14-6	15-4	13-4	14-10
	24	13-3	13-10	11-10	12-1	10-10	10-10
725FJ20	12	20-5	23-1	18-6	21-1	17-2	19-4
	16	18-6	21-0	16-11	19-8	15-8	17-7
	24	16-2	17-11	14-6	16-0	13-3	14-7
725FJ16	12	18-11	21-3	17-2	19-5	16-0	17-10
	16	17-1	19-4	15-6	17-5	14-6	15-11
	24	14-6	15-10	13-0	14-2	11-10	12-10
725FJ13	12	17-1	19-2	15-6	17-0	14-6	16-2
	16	15-5	16-6	13-9	14-7	12-7	13-2
	24	12-7	13-2	11-3	11-7	10-4	10-5
55FJ10	12	12-11	14-2	11-9	12-7	10-9	11-4
	16	11-5	12-1	10-3	10-8	9-4	9-8
	24	9-4	9-8	8-4	8-6	7-7	7-7

(1) Live-load deflection less than L/360. (2) Web stiffener with length at least 0.08 of span required over center support (see details).

Exterior Wall Studs

allowable axial loads(1) when combined with . . .

40-psf wind load (125 mph)

table 1

stud clear height spacing		allowable compressive load(1) (lb)											
		steel stud-section designation											
		3½"					5½"				7½"		
floor/ceiling unbraced ht(1) (ft)	spacing (in o.c.)	35ST8	35ST10	35ST13	35ST16	35ST20	55ST10	55ST13	55ST16	55ST20	75ST13	75ST16	75ST20
8	12	938	1648	2939	4920	6860	3076	4819	7080	9360	5070	7666	10290
	16	465†	1060	2225	4050	5886	2664†	4483	7080	9360	5070	7666	10290
	24	—	23†	964	2516	4167	1872†	3586	5992	8733	4805†	7666	10290
9	12	512†	1086	2173	3860	5543	2684†	4475	6990	9232	5043	7619	10221
	16	—	450	1400	2917	4484	2179†	3900	6318	9035	5043	7619	10221
	24	—	—	66	1295	2662	1226†	2808	4989	7572	4251†	7262	10221
10	12	126†	579	1475	2883	4315	2260†	3956	6326	8986	5013	7567	10143
	16	—	—	676	1912	3226	1667†	3273	5491	8062	4612	7567	10143
	24	—	—	—	265	1378	570†	2002†	3938	6336	3641†	6510	9536
11	12	—	140	869	2029	3234	1819†	3405	5585	8099	4729	7509	10058
	16	—	—	66	1060	2150	1148†	2624	4627	7029	4133†	7054	10058
	24	—	—	—	—	325	—	1199†	2885	5075	2987†	5696	8582
12	12	—	—	359	1307	2315	1374†	2839	4818	7167	4315	7230	9964
	16	—	—	—	359	1258	639†	1975	3758	5973	3621†	6405	9334
	24	—	—	—	—	—	—	429†	1870	3839	2303†	4833	7564
14	12	—	—	—	226	924	527†	1731	3308	5291	3411	6060	8848
	16	—	—	—	—	—	—	756†	2118	3936	2531†	5000	7645
	24	—	—	—	—	—	—	—	63	1591	910†	3044†	5418
16	12	—	—	—	—	22	—	745	1960	3576	2485†	4799	7298
	16	—	—	—	—	—	—	—	722	2162	1427†	3545	5862
	24	—	—	—	—	—	—	—	—	—	—	1299†	3286

35-psf wind load (120 mph)

table 2

8	12	1131	1883	3227	5270	7251	3233	4819	7080	9360	5070	7666	10290
	16	691†	1347	2573	4474	6361	2869†	4714	7080	9360	5070	7666	10290
	24	—	394†	1415	3064	4782	2164†	3918	6395	9173	5043	7666	10290
9	12	726	1346	2489	4245	5976	2878	4695	6990	9232	5043	7619	10221
	16	242†	759	1775	3374	4998	2429†	4185	6665	9232	5043	7619	10221
	24	—	—	540	1871	3309	1575†	3209	5477	8110	4548†	7611	10221
10	12	352†	850	1805	3284	4766	2492	4221	6652	9089	5013	7567	10143
	16	—	238	1062	2382	3753	1960†	3610	5903	8518	4860	7567	10143
	24	—	—	—	847	2031	969†	2465	4504	6966	4001†	6935	10010
11	12	22†	416	1202	2431	3685	2084†	3712	5963	8519	4956	7509	10058
	16	—	—	454	1528	2673	1477†	3008	5098	7555	4429	7404	10058
	24	—	—	—	—	968	371†	1715†	3515	5783	3410†	6198	9146
12	12	—	47	688	1703	2756	1668†	3183	5241	7642	4582	7445	9964
	16	—	—	—	816	1768	998†	2398	4276	6557	3964	6814	9795
	24	—	—	—	—	107	—	985†	2548	4606	2787†	5411	8215
14	12	—	—	—	594	1329	861†	2128	3794	5844	3755	6474	9317
	16	—	—	—	—	422	106†	1230	2696	4594	2964†	5522	8238
	24	—	—	—	—	—	—	—	793	2425	1499†	3755	6228
16	12	—	—	—	—	380	148†	1167	2471	4161	2870	5299	7869
	16	—	—	—	—	—	—	216†	1321	2846	1932†	4159	6565
	24	—	—	—	—	—	—	—	—	608	245†	2106†	4213

30-psf wind load (110 mph)

table 3

8	12	1331	2130	3527	5636	7660	3296	4819	7080	9360	5070	7666	10290
	16	938	1648	2939	4920	6860	3076	4819	7080	9360	5070	7666	10290
	24	230†	786	1891	3644	5431	2462†	4255	6804	9360	5070	7666	10290
9	12	951	1619	2823	4653	6434	3076	4768	6990	9232	5043	7619	10221
	16	512†	1086	2173	3860	5543	2684†	4475	6990	9232	5043	7619	10221
	24	—	157†	1044	2484	3997	1934†	3620	5977	8661	4848	7619	10221
10	12	592	1140	2156	3712	5247	2729†	4493	6888	9089	5013	7567	10143
	16	126†	579	1475	2883	4315	2260†	3956	6326	8986	5013	7567	10143
	24	—	—	311	1470	2730	1383†	2944	5089	7616	4366†	7364	10143
11	12	269	711	1558	2863	4168	2358	4029	6352	8931	4980	7509	10058
	16	—	140	869	2029	3234	1819†	3405	5585	8099	4729	7509	10058
	24	—	—	—	620	1658	829†	2252	4172	6520	3841†	6708	9718
12	12	—	342	1042	2127	3229	1974†	3541	5681	8136	4853	7445	9964
	16	—	—	359	1307	2315	1374†	2839	4818	7167	4315	7230	9964
	24	—	—	—	—	779	294†	1568	3261	5412	3283†	6002	8882
14	12	—	—	247	989	1764	1213†	2547	4307	6427	4109	6898	9752
	16	—	—	—	226	924	527†	1731	3308	5291	3411	6060	8848
	24	—	—	—	—	—	—	305†	1569	3311	2110	4493	7068
16	12	—	—	—	223	764	524†	1617	3017	4785	3297	5817	8462
	16	—	—	—	—	22	—	745	1960	3576	2458†	4799	7298
	24	—	—	—	—	—	—	—	158	1516	941†	2954	5185

(1) No limiting deflection, studs laterally braced, (about YY axis) with straps or facing materials. †End stiffener required.

25-psf wind load (100 mph)

table 4

stud clear height spacing		allowable compressive load[1] (lb)											
		steel stud-section designation											
floor/ceiling unbraced ht[1] (ft)	spacing (in o.c.)	3½"					5½"				7½"		
		35ST8	35ST10	35ST13	35ST16	35ST20	55ST10	55ST13	55ST16	55ST20	75ST13	75ST16	75ST20
8	12	1541	2387	3842	6020	8040	3296	4819	7080	9360	5070	7666	10290
	16	1197	1964	3326	5390	7386	3286	4819	7080	9360	5070	7666	10290
	24	572†	1202	2397	4260	6121	2766†	4598	7080	9360	5070	7666	10290
9	12	1189	1910	3178	5087	6922	3264	4768	6990	9232	5043	7619	10221
	16	799	1435	2598	4378	6126	2944	4768	6990	9232	5043	7619	10221
	24	113†	603	1585	3143	4737	2303†	4042	6491	9225	5043	7619	10221
10	12	848	1450	2534	4172	5765	2971	4710	6888	9089	5013	7567	10143
	16	430†	945	1919	3423	4923	2570	4311	6762	9089	5013	7567	10143
	24	—	76†	866	2143	3486	1813†	3441	5696	8289	4735	7567	10143
11	12	535	1030	1944	3330	4692	2641	4356	6754	8931	4980	7509	10058
	16	103†	512	1318	2572	3842	2174†	3817	6091	8662	4980	7509	10058
	24	—	—	257	1290	2408	1311†	2814	4860	7290	4281	7228	10058
12	12	259	662	1425	2588	3743	2293	3913	6141	8649	4943	7445	9964
	16	—	143	803	1841	2909	1768†	3301	5386	7804	4672	7445	9964
	24	—	—	—	584	1508	816†	2184	4015	6262	3792†	6608	9564
14	12	—	85	611	1418	2237	1588	2990	4852	7046	4472	7301	9752
	16	—	—	21	722	1470	976†	2265	3961	6035	3872	6614	9476
	24	—	—	—	—	184	—	990	2403	4261	2746†	5260	7939
16	12	—	—	53	607	1183	927†	2099	3604	5456	3741	6356	9077
	16	—	—	—	—	505	270†	1314	2649	4365	3010	5469	8064
	24	—	—	—	—	—	—	—	1017	2499	1677†	3849	6210

20-psf wind load (90 mph)

table 5

8	12	1761	2659	4174	6284	8040	3296	4819	7080	9360	5070	7666	10290
	16	1470	2300	3735	5890	7944	3296	4819	7080	9360	5070	7666	10290
	24	938	1648	2939	4920	6860	3076	4819	7080	9360	5070	7666	10290
9	12	1442	2221	3560	5554	7448	3264	4768	6990	9232	5043	7619	10221
	16	1108	1811	3057	4939	6756	3210	4768	6990	9232	5043	7619	10221
	24	512†	1086	2173	3860	5543	2684†	4475	6990	9232	5043	7619	10221
10	12	1125	1787	2945	4674	6330	3221	4710	6888	9089	5013	7567	10143
	16	760	1344	2405	4015	5587	2890	4677	6888	9089	5013	7567	10143
	24	126†	579	1475	2883	4315	2260†	3956	6326	8986	5013	7567	10143
11	12	826	1379	2367	3843	5268	2934	4646	6776	8931	4980	7509	10058
	16	444	921	1812	3170	4512	2545	4246	6619	8931	4980	7509	10058
	24	—	140	869	2029	3234	1819†	3405	5585	8099	4729	7509	10058
12	12	555	1014	1848	3097	4311	2628	4302	6622	8757	4943	7445	9964
	16	167	553	1294	2430	3566	2185	3787	5985	8476	4943	7445	9964
	24	—	—	359	1307	2315	1374†	2839	4818	7167	4315	7230	9964
14	12	115	426	1013	1893	2760	1988	3464	5437	7709	4845	7301	9752
	16	—	—	486	1271	2074	1460†	2839	4666	6835	4350	7187	9752
	24	—	—	—	226	924	527†	1731	3308	5291	3411	6060	8848
16	12	—	11	422	1031	1645	1366	2624	4245	6188	4206	6918	9507
	16	—	—	—	475	1039	789†	1934	3403	5227	3591	6173	8869
	24	—	—	—	—	22	—	745	1960	3576	2458†	4799	7298

15-psf wind load (80 mph)

table 6

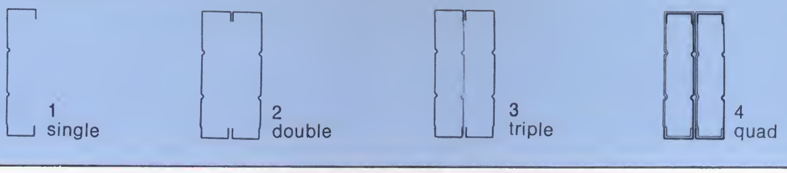
8	12	1994	2947	4327	6284	8040	3296	4819	7080	9360	5070	7666	10290
	16	1761	2659	4174	6284	8040	3296	4819	7080	9360	5070	7666	10290
	24	1331	2130	3527	5636	7660	3296	4819	7080	9360	5070	7666	10290
9	12	1716	2558	3974	6036	7694	3264	4768	6990	9232	5043	7619	10221
	16	1442	2221	3560	5554	7448	3264	4768	6990	9232	5043	7619	10221
	24	951	1619	2823	4653	6434	3076	4768	6990	9232	4053	7619	10221
10	12	1429	2158	3400	5232	6958	3228	4710	6888	9089	5013	7567	10143
	16	1125	1787	2945	4674	6330	3221	4710	6888	9089	5013	7567	10143
	24	592	1140	2156	3712	5247	2729	4493	6888	9089	5013	7567	10143
11	12	1149	1770	2841	4421	5916	3189	4646	6776	8931	4980	7509	10058
	16	826	1379	2367	3843	5268	2934	4646	6776	8931	4980	7509	10058
	24	269	711	1558	2863	4168	2358	4029	6352	8931	4980	7509	10058
12	12	888	1411	2326	3672	4954	2980	4576	6653	8757	4943	7445	9964
	16	555	1014	1848	3097	4311	2628	4302	6622	8757	4943	7445	9964
	24	—	342	1042	2127	3229	1974†	3541	5681	8136	4853	7445	9964
14	12	446	813	1470	2432	3354	2421	3975	6071	8366	4861	7301	9752
	16	115	426	1013	1893	2760	1988	3464	5437	7709	4845	7301	9752
	24	—	—	247	989	1764	1213†	2547	4307	6427	4109	6898	9752
16	12	117	373	840	1513	2171	1851	3203	4956	7000	4693	7136	9507
	16	—	11	422	1031	1645	1366	2624	4245	6188	4206	6918	9507
	24	—	—	—	223	764	524†	1617	3017	4785	3297	5817	8462

(1) No limiting deflection, studs laterally braced, (about YY axis) with straps or facing materials. †End stiffener required.

Lintels—allowable uniform load(1)

table 7

Lintel Components



lintel span (ft)	required no. of lintels(2) components	allowable uniform load(1) (lb/ft)										
		lintel component section designation										
		5½" stud sections			7½" joist sections			9½" joist sections		11½" joist sections		13½" joist
		55ST13	55ST16	55ST20	75FJ13	75FJ16	75FJ20	95FJ16	95FJ20	115FJ16	115FJ20	135FJ20
2	2	3570	5700	7456	2670	5162	9992	4054	7842	3344	6470	5488
	3	5355	8850	11184	4005	7743	14988	6081	11763	5016	9705	8232
3	2	2164	2622	3314	1780	3442	5044	2702	5228	2230	4314	3660
	3	3246	3933	4971	2670	5163	7566	4053	7842	3345	6471	5490
4	2	1218	1474	1864	1338	2312	2838	2028	3294	1568	2758	2604
	3	1827	2211	2796	2004	3468	4257	3042	4941	2352	4137	3906
5	2	780	944	1194	1068	1480	1816	1622	2588	1254	2094	2082
	3	1170	1416	1791	1602	2220	2724	2433	3882	1881	3141	3123
6	2	542	656	828	780	1028	1262	1354	1794	1044	1648	1438
	3	813	984	1242	1170	1542	1893	2031	2691	1566	2472	2157
8	2	304	368	466	438	474	710	816	1006	780	1348	1298
	3	456	552	699	657	711	1065	1224	1509	1170	2022	1947
10	2	195	236	298	274	304	454	522	642	516	860	924
	3	293	354	447	411	456	681	783	963	774	1290	1386
12	2	—	164	207	190	254	316	364	444	356	594	640
	3	204	246	311	285	381	474	546	666	534	891	960
	4	272	328	414	380	508	632	728	888	712	1188	1280
14	2	—	—	152	—	184	228	264	324	260	434	468
	3	150	180	228	207	276	342	396	486	390	651	702
	4	200	240	304	286	368	456	528	648	520	868	936
16	2	—	—	—	—	—	172	200	246	198	332	356
	3	—	—	175	159	210	258	300	369	297	498	534
	4	152	184	233	219	289	344	400	492	396	664	712
18	2	—	—	—	—	—	—	158	194	156	260	280
	3	—	—	—	—	165	204	237	291	234	390	420
	4	—	—	184	173	228	280	316	388	312	520	560
20	2	—	—	—	—	—	—	—	156	—	210	224
	3	—	—	—	—	—	150	189	234	186	315	336
	4	—	—	—	—	185	227	252	312	248	420	448

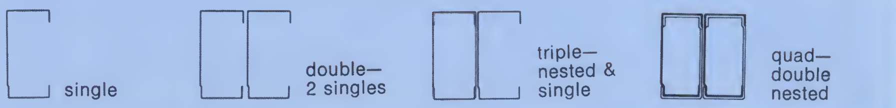
(1) Load values based upon lintel comprising the required no. of steel stud or floor joist sections of designation shown, and with "stiffened end condition" (see stiffener details, p. 7). Values shown in shaded areas indicate a load/span condition for which that section is not the most economical—read left to shallower sections of same style no. for optimum economy.

(2) Load value for a "single" or "quad" lintel, where not shown, may be obtained from the "double" lintel value—by dividing or multiplying by two, respectively.

Jamb Studs—allowable axial loads(1) when combined with 15/25 psf wind load

table 8

Jamb Stud Combinations

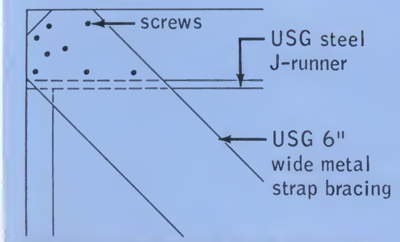


wind load (psf)	opening dimensions		allowable compressive load(1) (lb)											
			jamb stud section designation/combination											
	jamb ht.	lintel width	1 (single)			2 (double)			3 (triple)			4 (quad)		
			35ST13	35ST16	35ST20	35ST13	35ST16	35ST20	35ST13	35ST16	35ST20	35ST13	35ST16	35ST20
15	8′2″	6′	858	2520	3950	5660	9800	13300	10900	17500	23300	16300	25500	33500
		12′	—	—	765	2600	6120	9150	7400	13300	18500	12500	20900	28300
		18′	—	—	—	—	3030	5610	4360	9730	14400	9130	16900	23700
	10′2″	6′	—	320	1230	2780	5770	8310	6960	12000	16400	11400	18800	24700
		12′	—	—	—	—	1800	3800	2940	7190	10800	6900	13100	18400
		18′	—	—	—	—	—	81	—	3290	6310	3128	8650	13300
25	8′2″	6′	—	—	1080	2900	6480	9580	7740	13700	19000	12900	21400	28800
		12′	—	—	—	—	1500	3830	2840	7870	12300	7110	14900	21400
	10′2″	6′	—	—	—	—	2190	4210	3330	7660	11300	2390	13600	19000
		12′	—	—	—	—	—	—	—	1370	4210	1270	6450	10800

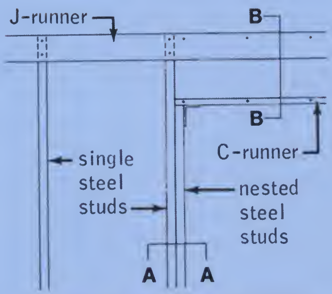
(1) Lintel loads must be applied so that no eccentricity is introduced by attachment, and both jamb stud flanges must be laterally braced about the weak (YY) axis, normally accomplished with wall surfacing materials.

Details

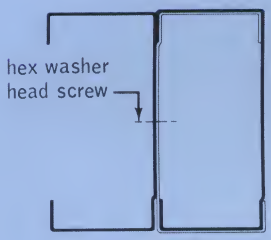
typical stud assemblies



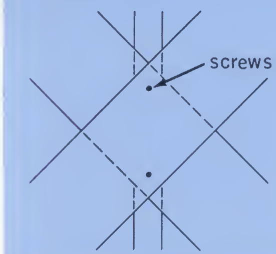
bracing attachment at runners



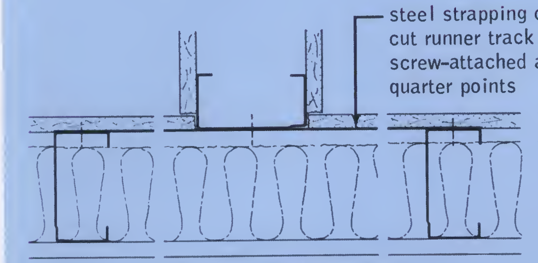
opening corner elevation
openings 8′ to 17′ wide



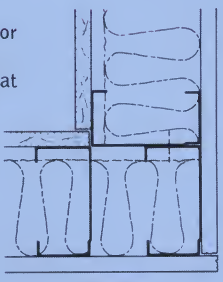
section AA
openings 8′ to 17′ wide



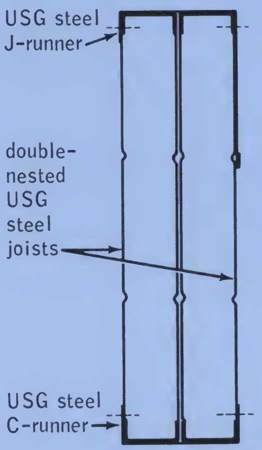
X-bracing attachment at studs


steel strapping or cut runner track screw-attached at quarter points

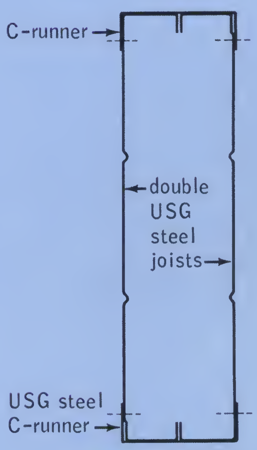
partition intersection



corner

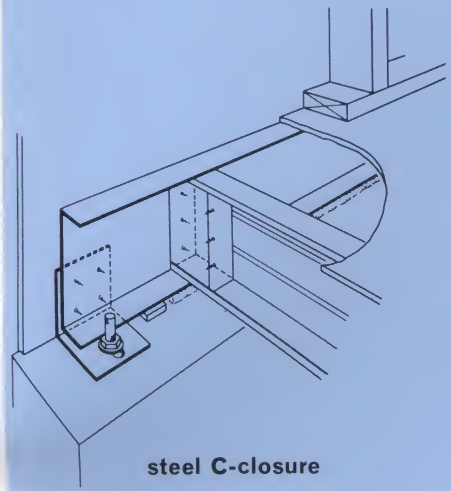


section BB
openings 8′ to 17′ wide



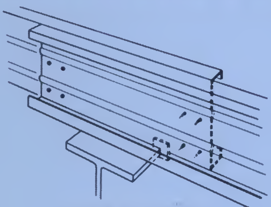
section BB alt.
openings 3′ to 8′ wide

typical joist assemblies

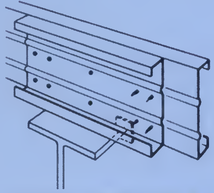


steel C-closure

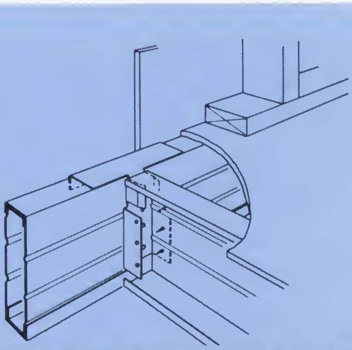
web stiffener over interior support



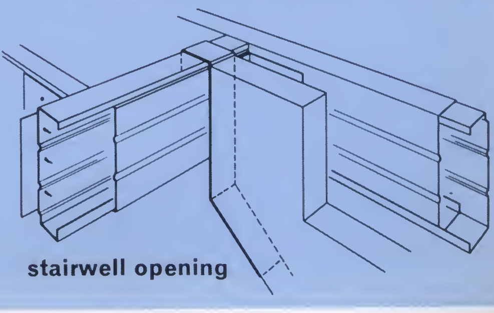
joist spliced



joist continuous



steel joist attachment with hanger



stairwell opening

SA 510 **USG Light Steel Framing**

Architectural Specifications

notes to architect

These specifications cover basic framing of load-bearing walls and floor/ceilings with USG Light Steel Framing. For further information contact your local U.S.G. representative, and see U.S.G. technical folders CS-24, CS-4 and CS-3.

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages, handled to avoid damage, stored off the ground in a protected area, covered with tarpaulins or plastic, vented to avoid condensation and entrapped moisture, until ready for installation. Damaged or deteriorated materials shall be removed from the premises.

Part 2: products

2.1 materials

a. USG Light Steel Studs—(35)(55)(75)ST(8)(10)(13)(16)(20).

b. USG Light Steel Runners—(35)(55)(75)CR(8)(10)(13), (35)(55)(75)JR(8)(10)(13).

c. USG Steel Joists—(55)(725)(75)(925)(95)(115)(135) FJ(10)(13)(16)(20).

d. USG Brand Screws—(⅜″ Type S, hex washer head) (½″ Type S-12, hex washer, pan or low-profile head) ($1\frac{5}{16}$″ pilot point, bugle head) ($1\frac{15}{16}$″ pilot point, bugle head).

e. DURABOND Multi-Purpose Adhesive.

f. Accessories—C-closures (style), End Clips (size), Foundation Clip, Joist Attachment Bracket (size), 2″ Strap Bracing, Plastic Grommets.

Part 3: execution

3.1 steel joist installation

Position joists across supports according to layout. Securely anchor header joists and C-closures to foundation at 6-ft. intervals and to top plates at 4-ft. intervals. Fasten joist ends to headers with end-clips, and screw or nail joist hangers and web stiffeners in place.

Use double-nested joists as headers and trimmers around floor openings, attached with end clips and Type S-12 Screws. Screw-attach web stiffeners to joist webs at intermediate and end supports, and secure joists to supports. Provide stiffeners or extra joists above and below load-bearing partitions. Install bridging mid-span where spans exceed 15 ft.

3.2 plywood subfloor installation

Apply ⅜″ adhesive bead to center of top flange of joists. Position plywood subflooring with long dimension across or parallel to joists and secure with $1\frac{15}{16}$″ pilot point, bugle head screws at 24″ o.c. max.

3.3 stud and runner installation

Align runners accurately according to layout, and securely anchor to floor and overhead structure with power-driven fasteners at 24″ o.c. and 2″ from each end. Fasteners must develop min. 193 lb. shear and 200 lb. bearing without exceeding allowable design stresses in structural base or head.

Position studs vertically in runners, at 24″ o.c. max., and securely anchor to runner with one screw or weld in each flange top and bottom. Axially loaded studs may not be spliced.

Cut sills and headers from runners and install at all openings as shown in details. Securely attach runners to supporting studs on each side of opening and install cut-to-length studs between runners.

All products described here may not be available in all geographic markets. Consult your U.S.G. sales office or representative for information.

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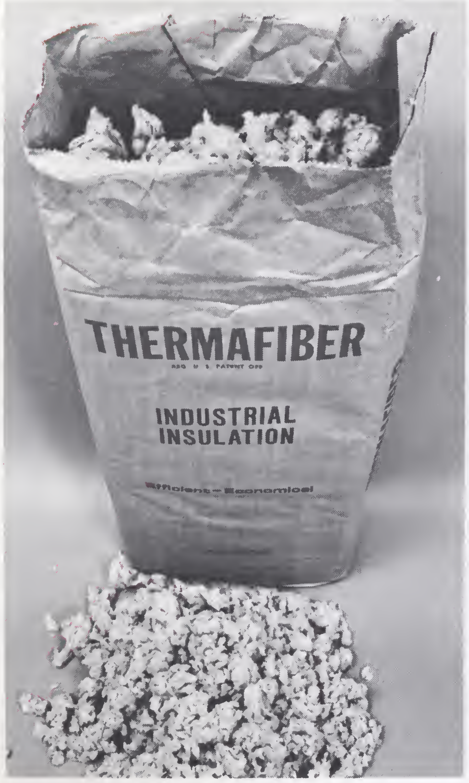

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7P
INDUSTRIAL INSULATION
insulation wool

physical properties

Thermafiber® Industrial Bulk Wool

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physical and design data

product designation	nom. density—lbs. per cu. ft.	k-factor Btu / in. / hr. / sq. ft. 75°F. m.t.	recommended max. temp.	container size—cu. ft.	avg. wt. lbs. / bag
Industrial Bulk Wool		(Density varies with packing pressure—five random densities shown.)			
	3.0	.280	400	2.8	—
Granulated	4.0	.270	400		30
Packing	6.0	.250	600		30
Dry Granulated	10.0	.270	800		20
	12.0	.280	1,200		—
Industrial Spray Wool	NA	NA	NA	2.8	30

NA—not applicable. Packing wools for hand packing, granulated wool for pouring, spray wool for machine application.

NOTE: Wool for any cryogenic application must be dry wool. Dry wool products have a maximum oil content of .17% by weight. They are manufactured for applications where a normal amount of oil might create an explosive hazard. Because conditions of application and use are beyond its control, United States Gypsum Company cannot assume responsibility for any fire and explosion hazard.

Industrial Blowing Wool
for cryogenic application
(except oxygen)

mean temp.		k-factor (1)
°F.	°C.	Btu/in./hr./sq. ft./°F.
72	22	0.245
32	0	0.23
−112	−80	0.18
−256	−160	0.14

(1) Density: 4 pcf.

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specification compliance

ASTM E84—Fire Hazard Classification: flame spread 10, fuel contributed 0, smoke developed 0. Noncombustible per ASTM E-136.

THERMAFIBER Industrial Blowing Wool meets Federal Specification HH-I-1030A except for identification of R value.

THERMAFIBER #10 Granulated Wool meets U.S. Coast Guard Specification 164.009.

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availability

product designation	S. Plainfield, N.J.	Corsicana, Tex.	Wabash, Ind.	Tacoma, Wash.	Birmingham, Ala.
Granulated	X(1)	X(1)	X(1)	X	X(1)
#10 Granulated	X	X	X	X	
Dry Granulated	X	X	X		
Packing	X		X		
Spray	X	X	X	X	X

(1) Baled wool also available.

For further information on these products, contact U.S.G. Mineral Fiber Products Division, Dept. #470, Chicago, or sales offices as follows:

Alabama: Birmingham, (205) 252-6432 • Indiana: Wabash, (317) 563-2111 • New Jersey: S. Plainfield, (201) 756-6776 • Texas: Corsicana, (214) 874-4781 • Washington: Tacoma, (206) 922-8756

UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

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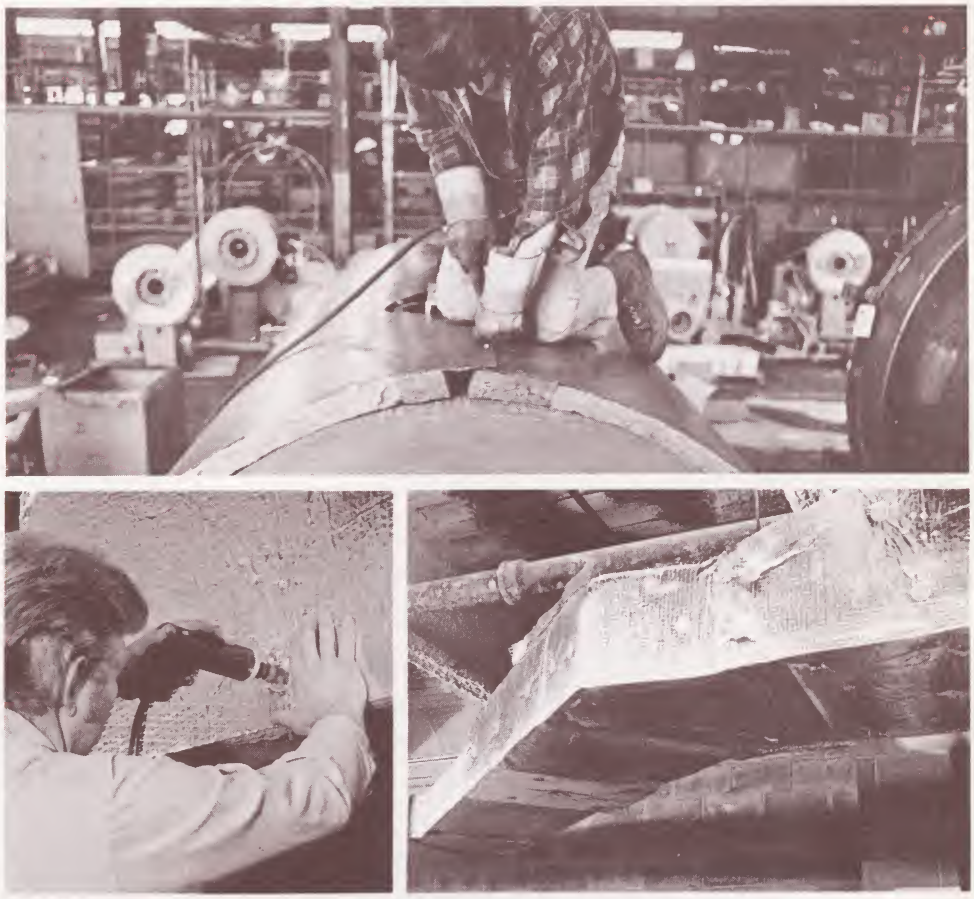
Thermafiber® INDUSTRIAL FELT

. . . for thermal, fire-protection and sound-control applications in industry



THERMAFIBER Industrial Felt is ideal insulation for package boilers *(top)*, and especially effective with foil skrim kraft facing for heating/cooling ducts *(bottom)*.

- CONTAINS NO ASBESTOS
- NONCOMBUSTIBLE
- NONCORROSIVE
- EASILY HANDLED
- PERMANENT PERFORMANCE

ECONOMICAL, EASILY APPLIED—A low-cost, preformed mineral-fiber felt for thermal, fire-protection and sound-control applications. Its fine-fiber, semi-rigid composition makes THERMAFIBER Felt easy to handle.

WIDE RANGE OF APPLICATIONS—High-melt point and eight densities make THERMAFIBER Felt exceptionally versatile for commercial and industrial applications, in a wide range of low- to hot-surface temperatures. Included are *thermal applications*—commercial and industrial ovens, package boilers, dryers, walk-in freezers and coolers; *fire-protective applications*—metal fire doors, light fixture protection and ship bulkheads; *sound-control applications*—metal partitions, sound booths and acoustical decks.

NONABSORBENT, CORROSION-RESISTANT—THERMAFIBER Felt absorbs less than 1% moisture, will not corrode steel or aluminum.

UNITED STATES GYPSUM

UNITED STATES GYPSUM
1977—6
7 P INDUSTRIAL INSULATION
insulating blankets

physical properties

Thermafiber® Industrial Felt

fire resistance: Rated noncombustible, in accordance with NFPA definition. Melting point exceeds 2,000°F, and the product withstands ASTM E119 temperatures for over five hours when mechanically supported. *Fire hazard classification:* flame spread 15, fuel contributed 0, smoke developed 0. Meets ASTM E-136.

sound absorption coefficients

specimen tested	band center frequency—Hz						NRC
	125	250	500	1000	2000	4000	
6.0 pcf—2″	.25	.80	.99	.99	.99	.93	.95

NOTE: Test specimen was metal-skinned, insulation-filled acoustical enclosure panel.

sound attenuation—db

specimen tested	band center frequency—Hz						STC
	125	250	500	1000	2000	4000	
6.0 pcf—2″	24	27	34	47	50	51	39

NOTE: Test specimen same as for sound absorption.

thermal conductivity

density—pcf	k-factor—Btu/in./hr./sq. ft./°F.				
	75°	200°	300°	400°	500°
2.5	.27	.40	.51	—	—
3.0	.26	.35	.45	—	—
3.5	.26	.35	.44	—	—
4.0	.25	.34	.42	.51	.60
4.5	.25	.33	.41	.49	.58
6.0	.24	.30	.38	.46	.56
8.0	.23	.29	.35	.43	.53
9.0	.23	.28	.34	.42	.51

maximum hot-surface temperatures (enclosed panel)

density—pcf	max. °F.	density—pcf	max. °F.
2.5	400	4.5	800
3.0	500	6.0	1,000
3.5	600	8.0	1,000
4.0	800	9.0	1,000

NOTE: Temperatures above 450° require mechanical support.

desired cold-surface temperatures: Data on cold-surface temperatures for THERMAFIBER Felt used on ovens, furnace walls, etc., available upon request.

chemical state: High melt-point mineral glass formulation.

specification compliance

meets →	Federal Specification HH-I-558B ASTM C612-70				U.S. Coast Guard Specifications			
nom. density—pcf	Form A, Class 1	Form A, Class 2	Form A, Class 3	Form A, Class 4 (except compression on C-612-70)	N&VI Circular No. 10-63	Standard 164.007/46/0 A-30	Standard 164.007/40/0 A-60	Standard 164.009/124/0
3.0	X	X						
4.0	X	X						X
4.5	X	X						X
6.0	X	X	X	X		X(2)		X
7.0	X	X	X	X	X(1)		X(3)	X
8.0	X	X	X	X				X
9.0	X	X	X	X				

(1) 1½″ thick (2) 2″ thick. (3) 3″ thick. Other specifications: All felts meets applicable analysis for chloride content on the basis of plot points for austenitic stainless steel per MIL 1-24244.

physical data

nom. density—pcf	approx. density tolerances—pcf	container size	avg. wt.—lbs. /MBF		application method
			sleeve or bag	ctn.	
2.5	± 0.5	per customer specifications	250	290	hand application—friction fitted
3.0	± 0.5		300	340	
3.5	± 0.5		340	380	
4.0	± 0.75		400	440	
4.5	± 0.75		450	490	
6.0	± 0.75		570	610	
8.0	± 1.0		780	800	
9.0	± 1.5		840	860	

sizes & availability from U.S.G. plants

density lbs./cu. ft.	S. Plainfield, N.J. (1)			Corsicana, Tex.			Wabash, Ind. (1)			Tacoma, Wash.		
	min. thick.	max. thick.	width	min. thick.	max. thick.	width	min. thick.	max. thick.	width	min. thick.	max. thick.	width
2.5	1″	6″	60″	1″	4″	90″	1″	6″	48″	2″	5″	89″
3 & 3.5	1″	6″	60″	1″	4″	90″	1″	6″	48″	1½″	5″	89″
4 & 4.5	1″	5″	60″	1″	3″	90″	1″	5″	48″	1½″	4″	89″
6	1″	8″(2)	60″	1½″	2½″	90″	1″	8″(2)	48″	—	—	—
8	1″	6″(2)	60″	—	—	—	1″	6″(2)	48″	—	—	—
9	1″	5″(2)	60″	—	—	—	1″	5″(2)	48″	—	—	—

NOTE: Dimension tolerances—width ± ⅛″, length ± ½″, thickness − ⅛″ + ¼″. (1) Aluminum foil-faced industrial felts are available from Wabash and South Plainfield plants only, with densities and minimum thicknesses of: 4- & 4.5-pcf, 2″; 6-pcf, 1½″; 8-pcf, 1″; 9-pcf, 1″. (2) Thicknesses are available in ½″ increments and may be laminated in thicknesses over 2½″ from Wabash and South Plainfield plants only.

For further information on these products, including nonstandard sizes, contact U.S.G. Mineral Fiber Products Division, #470, Chicago, or sales offices as follows: Alabama: Birmingham (205) 252-6432 • Indiana: Wabash (219) 563-2111 • New Jersey: S. Plainfield (201) 756-6776 • Texas: Corsicana (214) 874-4781 • Washington: Tacoma (206) 922-8756

UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

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product folder

Thermafiber®
Building and Acoustical Insulation

SA 705

7.14/Un

UNITED STATES GYPSUM
1977—1
7P
BUILDING INSULATION
board & batts

description and utility

THERMAFIBER Insulation Products consist of spun mineral fibers formed into mats of varying dimensions and densities depending on use, or into pellet forms for pouring or blowing into framing spaces. They are available in various types of blankets, in loose fill, and as semi-rigid safing, curtain wall and column fireproofing insulation.

Compared to other types of insulation, THERMAFIBER has superior resistance to heat and sound transmission, resilience that assures full installed thickness, and outstanding durability. Its greater rigidity aids staying in place. In manufacturing it is quality-controlled from start to finish. Other features:

Noncombustible—the mineral fibers will not burn or support combustion. Use of THERMAFIBER blankets increases fire ratings of certain partition assemblies. When subjected to ASTM E119 time-temperature criteria, THERMAFIBER Insulation remains intact and is significantly superior to low-melt point glass-fiber insulation in fire resistance. See separate folder in this series, SA-707, for details on THERMAFIBER Fire Safety Systems.

Vapor Resistance—three types of THERMAFIBER blankets have built-in vapor barriers to protect against condensation. Aluminum foil or strong, asphalted kraft paper have excellent vapor resistance factors of 0.30 and less than 1.00 perm respectively. Other types are highly effective in sidewalls when used with USG Gypsum Sheathing and Foil-Back SHEETROCK Gypsum Panels, Foil-Back IMPERIAL Gypsum Base or Foil-Back ROCKLATH Plaster Base.

Moisture Resistance—mineral fibers do not absorb moisture. If wet, they dry quickly with adequate ventilation and recover their original insulating efficiency.

Asbestos-Free—THERMAFIBER Insulation products contain no asbestos in any form.

Nondeteriorating—the mineral fibers offer no sustenance to vermin; are resistant to decay and corrosion.

Rigidity, Strength—THERMAFIBER blankets have exceptional built-in rigidity, especially important for ceiling work. Batts have triple-thick, extra-wide flanges which make installation quicker and more secure.

Sound Control Value—THERMAFIBER blankets increase sound isolation and STC ratings when used in certain partition and floor/ceiling assemblies. Their acoustical absorption properties can be utilized to reduce noise levels and reverberation.

Ventilation—insulation of attics and crawl spaces should be accompanied by adequate ventilation. HUD/FHA recommendations of one sq. ft. free vent area per 150 sq. ft. of attic or basementless floor area should be followed to help reduce air-conditioning costs and control moisture condensation.

general limitations

1. Although the vapor barriers of THERMAFIBER blankets protect against the formation of condensation and reduce the danger of damage caused by condensation, over-humidification must be guarded against. If the relative humidity in the building is excessive, steps must be taken to reduce the sources of moisture.

2. If THERMAFIBER Insulation is placed in direct contact with exterior walls, the masonry must be watertight. Positive vapor barriers such as Foil-Back SHEETROCK or ROCKLATH or 6-mil polyethylene film should be applied to room side of furring members in order to reduce possibility of condensation on cold masonry walls.

Installing THERMAFIBER Blankets between steel studs.

3. Blankets placed between floor joists over unexcavated or basement areas should be supported by wire mesh, woven tie-wire or flexible metal rods.

4. Additional support is required for 5¼″ and 6″ thick blankets when joist spacing exceeds 16″ o.c. and for blankets 3″ or thicker installed between joists over suspended ceilings in high-humidity areas.

5. THERMAFIBER Blankets faced with foil or kraft vapor barriers which contain asphalt, should be treated as a flammable surface, never exposed to open flame or used in exposed application.

thermal insulating properties

In this era of fuel shortage, adequate insulation is an important part of the government's energy-conservation program. Proper insulation reduces heat transmission through walls, ceilings and floors to control interior temperatures for added comfort and fuel savings. Insulation is unique in amortizing its cost with dividends from lower heating/cooling costs.

In accordance with industry standards, THERMAFIBER Insulation products are labeled to show each product's thermal resistance (of insulation only) and thickness. Resistance and conductance values listed below are for insulating blankets shown on pages 2 and 3.

product & thickness	therm. resist. (R) (insul. only)	conductance (C)	product & thickness	therm. resist. (R) (insul. only)
kraft-faced blankets			**foil vapor barrier side (1)**	
6″	22	0.05	6″	22
5¼″	19	0.05	5¼″	19
3½″	13	0.08	3″	11
3″	11	0.09	2⅝″	9

(1) For insulation with foil facing an air space (min. ¾″ in walls 1″ in floors and ceilings), the installed "R" is higher than for non-foil faced insulation of equal conductance.

thermal resistance values* (R=1/C)

for use in calculating heat transmission coefficients (U)

material	R	material	R
25/32" insulating sheathing (1)	2.06	½" gypsum panels	0.45
½" insulating sheathing (1)	1.32	⅜" plaster base	0.32
½" gypsum sheathing (1)	0.45	½" sanded plaster	0.09
½" plywood	0.62	½" plaster with lt. wt. aggregate	0.32
¾" plywood	0.93	portland cement with sand aggregate (per in.)	0.20
¼" hardboard	0.18	4" common brick	0.80
25/32" softwood (pine)	0.98	4" face brick	0.44
¾" hardwood	0.68	8" clay tile	1.85
asbestos shingles	0.21	8" concrete block with sand aggregate	1.11
1"x8" wood drop siding	0.79	vapor-permeable felt	0.06
¾"x10" beveled wood siding	1.05	vapor barrier plastic film	negl.
exterior stucco (per in. thickness)	0.20	carpet and fiber pad	2.08
⅜" built-up roofing	0.33	floor tile—asphalt, vinyl	0.05
wood shingle roofing	0.94		
asphalt shingle roofing	0.44		

(1) Based on data by United States Gypsum

	(type of insulation)	
	non-reflective	reflective
air space values		
1" to 4" heat flow up	0.94	2.73
1" to 4" heat flow down	1.08	4.41
¾" to 4" heat flow horizontal	1.01	3.45
air surface values		
heat flow up	0.61	1.32
heat flow down	0.92	4.55
heat flow horizontal, outside air (15 mph velocity)	0.17	—
heat flow horizontal, inside air (still)	0.68	—

*Based on listings in ASHRAE Handbook of Fundamentals (1972).

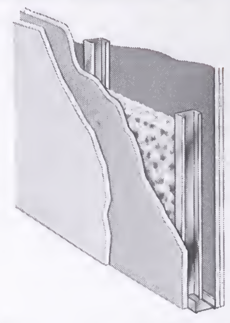
THERMAFIBER insulation selector

section to be insulated	U-value desired	THERMAFIBER R-value needed for "U" shown
ceilings	0.02	R-38+
	0.03	R-30+
	0.04	R-22+
	0.05	R-19
walls	0.05	R-19+
	0.08	R-13
	0.09	R-11
floors (over unheated space)	0.04	R-22+
	0.05	R-19+
	0.08	R-13
	0.09	R-11

+Recommended in regions with prolonged periods of extreme summer and winter temperatures.

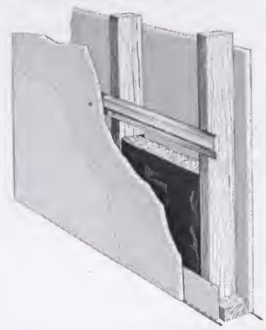
typical sound-barrier assemblies

steel stud—gypsum drywall



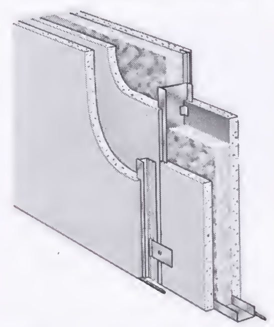
STC 54 2-hr. (UL Des U412)

wood stud—veneer plaster



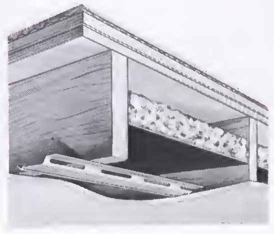
STC 50 1-hr. (UL Des U311)

ULTRAWALL movable partition



STC 50 2-hr. (UL Des U416)

floor/ceiling—resilient drywall



STC 52, IIC 71 1-hr. (est. based on UL Des L514)

sound control properties

THERMAFIBER Insulation has excellent sound-absorbing properties in addition to providing thermal values. Sound-absorbing materials absorb energy from sound waves and convert it to heat. As energy is absorbed, there is a proportional reduction in the amount of sound transmitted.

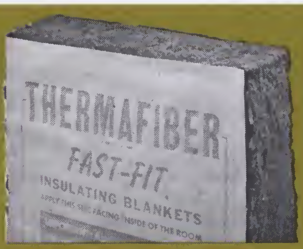
Two types of THERMAFIBER Insulation are used for their acoustic properties:

THERMAFIBER Regular Blankets, enclosed in heavy paper, are used in wood-frame construction; **THERMAFIBER Z-Furring Blankets** and **THERMAFIBER Sound Attenuation Blankets,** paperless and of greater density, are designated in fire-rated assemblies. THERMAFIBER Insulation in partition cavities improves STC ratings up to nine points.

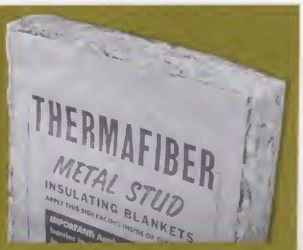
Sound ratings are based on tested results of specific components and details of assembly, not on the ceiling or partition membrane alone (see Construction Selector for tested assemblies). The sound control of an assembly cannot be accurately predicted if insulation of unequal properties is substituted.

THERMAFIBER
Regular Blanket

THERMAFIBER
Aluminum Foil-Faced Blanket



THERMAFIBER
Fast-Fit Blanket



THERMAFIBER
M-S Blanket

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types and functions

insulating blankets

Thermafiber Regular Blankets are faced on one side with strong asphalted vapor barrier that extends to form nailing flanges, and are encased on the other sides with porous, kraft breather paper. These blankets also are supplied open-faced without breather paper. **Uses:** ceilings, floors, walls. Where installed from the cold side of framing, as in crawl spaces, blankets are held in place with chicken wire or tie wire stapled or nailed to joists or by using flexible metal rods. Available in 3″ to 6″ thicknesses and in widths to accommodate common structural spacings. Meet Federal Specs. HH-I-521E Type II and ASTM C665.

Thermafiber Aluminum Foil-Faced Blankets are similar to paper-enclosed Regular Blankets, but with highly reflective aluminum foil laminated to vapor barrier side. Blankets require a minimum air space next to the foil of ¾″ in sidewalls and 1″ in ceilings to fully benefit from the foil reflectivity. **Uses:** ceilings, walls, floors with air space—most effective with air-conditioning and in areas of extreme summer temperatures. Available in 2⅜″, 3″, 5¼″ and 6″ thickness, 15″ and 23″ widths. Meet Federal Specs. HH-I-521E Type III and ASTM C665.

Thermafiber Flame-Resistant Blankets are open-faced, foil-covered on vapor barrier side, with stapling flanges. The foil-kraft laminate is applied with a special flame-resistant adhesive. Blankets require a minimum air space same as Foil-Faced Blankets for improved installed resistance. **Uses:** ceilings, floors, walls for flame-resistant insulation and vapor control or where insulation will be exposed. Available in 3″ and 5¼″ thickness, 15″ and 23″ widths for wood framing, 16″ and 24″ widths for steel framing, 48″ length. With foil attached, UL fire hazard classification: flame spread 25, fuel contributed 0, smoke developed 0. Meet Federal Specs. HH-I-521E, Type III and ASTM C665.

Thermafiber Fast-Fit Blankets have no flanges, thus eliminate need for staple fastening: are made slightly wider than normal to give snug friction fit between studs; open-faced on breather side. **Uses:** for sidewalls only. Fast-Fit Blankets require a separate vapor barrier, such as Foil-Back Sheetrock Gypsum Panels, Rocklath or Imperial Gypsum Bases, or a 6-mil polyethylene film. Available in 3″ and 3½″ thickness, 15″ width. Meet Federal Specs. HH-I-521E Type II and ASTM C665.

Thermafiber M-S Blankets are specially designed for insulating *exterior* furring and curtain wall assemblies which utilize steel studs. They are flangeless and require same types of separate vapor barrier as Fast-Fit Blankets. Staple-attached to gypsum sheathing or held in place against metal lath with horizontal tie-wires. Available in 16″ and 24″ widths, 48″ length, meeting ASTM C665 and Federal Specs. HH-I-521E (of type indicated) from following U.S.G. plants: Plainfield, Tacoma—paperless (Type I), 3″ thick; Corsicana, Wabash—paper on interior side only (Type II), 3″ or 3⅝″ thick (also from Wabash, 96″ length).

THERMAFIBER
Z-Furring Blanket

THERMAFIBER
Sound Attenuation Blanket

Application of
Foil-Faced Blankets

Application of
Sound Attenuation Blankets

Thermafiber Z-Furring Blankets are designed for use as an effective semi-rigid insulating material in exterior wall furring applications using USG Z-Furring Channels. They require same types of separate vapor barrier as Fast-Fit Blankets. Blankets are a paperless, semi-rigid spun mineral fiber mat, 1″, 1½″, 2″ and 3″ thickness, 16″ and 24″ widths, 48″ length, with densities of 6.0, 4.5, 4.0 and 4.0 pcf, and "k" factors of 0.24, 0.25, 0.25 and 0.25 respectively. Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Meet Federal Specs. HH-I-521E Type I except identification marking paragraph 3.7.1.

sound attenuation blankets

Thermafiber Sound Attenuation Blankets are a paperless, semi-rigid spun mineral fiber mat which substantially improves STC ratings when used in stud cavities of U.S.G. partition assemblies. Each blanket has a dense, highly complex labyrinthine structure composed of millions of sound-retarding air pockets. Available in 1″, 1½″ and 2″ thickness with 4.0, 3.0 and 2.5 pcf density respectively, 16″ and 24″ width, 48″ length. Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Meet Federal Specs. HH-I-521E Type I except identification marking paragraph 3.7.1.

Thermafiber Sound Attenuation Blankets are used in various partition systems listed below (for details see Construction Selector—in Sweet's Sec. 9.5).

Drywall Partitions	**STC Rating**
Steel Stud—Double Layer Gypsum Panels	52 to 55
Steel Stud—Single Layer Gypsum Panels	45 to 47
Movable	46 to 50
Veneer Plaster Partitions	
Steel Stud—Double Layer Gypsum Base	48 to 53
Steel Stud—Single Layer Gypsum Base	45
Trussteel Stud—Resilient Gypsum Base	48
Conventional Plaster Partitions	
Trussteel Stud—Resilient Gypsum Lath	46 to 52

specifications

notes to architect

1. *See U.S.G. Construction Selector for STC ratings of partition and floor/ceiling assemblies with THERMAFIBER Insulation.*

2. *In areas where high humidity and temperature predominate, consideration should be given to placing the vapor barrier on the warm or outside of the wall to prevent moisture condensation within the insulation.*

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications
All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials
All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

Part 2: products

2.1 materials

2.1.1 Insulating Blankets: THERMAFIBER (Regular) (Open-Faced) (Foil-Faced) (Flame-Resistant) (Fast-Fit) (M-S) (Z-Furring) blankets, ( ) thick, ( ) wide, ( ) long.

2.1.2 Sound Attenuation Blankets: THERMAFIBER Sound Attenuation Blankets, ( ) thick, ( ) wide, 48″ long, ( ) pcf density.

Part 3: execution

3.1 insulating blanket application
Install THERMAFIBER Insulation in framing spaces, including areas between floor joists and outside headers, leaving no voids. Install behind electrical outlets, around structural obstructions, jambs, sills, etc. Cover all such areas as well as plates and headers with vapor barrier paper.

a. Insert flanged blankets between framing members, vapor barrier facing inward and recessed (¾″) (1″) from face of framing, flanges stapled to sides of framing members at each end of blanket and along length of flanges. Staple flanges 6″ o.c. max. on walls and ceilings, 4″ o.c. max. on floors. Use 9/16″ staples in a trigger or power stapler.

If required by local code, flanges on vapor barrier sides of blankets may be stapled to faces of framing members providing abutting flanges do not overlap and are stapled flat, without bulges or folds that will prevent tight attachment of interior surfacing materials.

b. Install Fast-Fit Blankets between studs from interior side of wall, recessed slightly from stud faces. Do not staple—friction fit holds blankets in place. Provide separate vapor barrier with installation of: Foil-Back (SHEETROCK Gypsum Panels) (ROCKLATH Plaster Base) (IMPERIAL Gypsum Base) (6-mil polyethylene film).

c. Install M-S Blankets between studs from interior side of wall. Attach blankets to gypsum sheathing using 9/16″ staples with divergent points placed at each corner and in center of each blanket. Hold blankets tightly against metal lath backing with taut horizontal tie-wires spaced max. 36″ o.c. *Provide separate vapor barrier same as for Fast-Fit Blankets.*

3.2 furring blanket application
Position Z-Furring Blanket vertically against wall surface. Hold in place with a USG Z-Furring Channel according to U.S.G. directions. Position next blanket so that it abuts attached furring member and hold in place with next furring channel.

3.3 sound blanket application
Install THERMAFIBER Sound Attenuation Blankets in stud cavities of sound-rated partitions, attaching to one base layer of (SHEETROCK Gypsum Panels) (ROCKLATH Plaster Base) (IMPERIAL Gypsum Base).

Attach with five 9/16″ long staples driven through each blanket, one in center and one spaced in approx. 3″ from each corner. For reinforcement, drive staples to straddle drywall or similar nails placed against blankets, or through 1½″ lengths of PERF-A-TAPE Reinforcing Tape or equivalent. Butt ends of blankets closely together and fill all voids. Allow air space between backs of blankets and back of opposite face layer.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, THERMAFIBER, SHEETROCK, ROCKLATH, IMPERIAL, PERF-A-TAPE, TRUSSTEEL, ULTRAWALL.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

U.S.G. MINERAL FIBER DIV. SALES OFFICES: **ALABAMA:** Birmingham, (205)252-6432 • **INDIANA:** Wabash, (219)563-2111 • **NEW JERSEY:** S. Plainfield, (201)756-6776 • **TEXAS:** Corsicana, (214)874-4781 • **WASHINGTON:** Tacoma, (206)922-8756.

U.S.G. CONSTRUCTION DIV. SALES OFFICES: **ALABAMA:** Birmingham, 942-7970 • **ARIZONA:** Phoenix, 269-5665 • **CALIFORNIA:** Fremont, 792-4400; Los Angeles, 388-1171; Orange, 547-7403 • **COLORADO:** Denver, 744-7008 • **FLORIDA:** Jacksonville, 396-1628; No. Miami Beach, 949-3436 • **GEORGIA:** Atlanta, 393-0770 • **HAWAII:** Honolulu, 538-7712 • **ILLINOIS:** Chicago, 321-4100 • **INDIANA:** Indianapolis, 257-9171 • **KANSAS:** Overland Park, 341-6600 • **KENTUCKY:** Louisville, 897-2529 • **LOUISIANA:** New Orleans, 241-2020 • **MARYLAND:** Baltimore, 355-2200 • **MASSACHUSETTS:** Littleton, 486-8917 • **MICHIGAN:** Southfield, 569-1900; Grand Rapids, 459-4477 • **MINNESOTA:** Minneapolis, 835-4626 • **MISSOURI:** St. Louis, 872-9172 • **NEBRASKA:** Omaha, 333-5204 • **NEW JERSEY:** Kearny, 997-1600 • **NEW YORK:** Tarrytown, 332-0800 • **NORTH CAROLINA:** Charlotte, 332-5023 • **OHIO:** Cincinnati, 771-3215; Chesterland, 729-1957; Columbus, 451-7710 • **PENNSYLVANIA:** Philadelphia, 724-4552; Pittsburgh, 341-0364 • **TENNESSEE:** Nashville, 254-0622 • **TEXAS:** Dallas, 357-6271; Bellaire, 666-0751; San Antonio, 342-5249 • **UTAH:** Salt Lake City, 359-3751 • **VIRGINIA:** Norfolk, 461-1332; Richmond, 285-7528 • **WASHINGTON:** Bellevue, 455-2595 • **WISCONSIN:** Milwaukee, 355-5850.

UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606
SA-705/USG/Rev. 1-77

Thermafiber®
Fire-Safety Systems

system folder

Once a high-rise fire has started, the building's first line of defense must be to contain the fire to its floor of origin.

UNITED STATES GYPSUM
1977—1
7 P
BUILDING INSULATION
felts, fire-safing, fireproofing

THERMAFIBER
Proven fire-protective insulations for curtain walls and perimeter framing

- **FIRE-RESISTANT**—withstand ASTM E119 fire test conditions
- **NONCOMBUSTIBLE**—when tested per ASTM E136—melt point exceeds 2000°F
- **DURABLE**—nondeteriorating, noncorrosive
- **ENERGY-SAVING**—conserve fuel and reduce costs
- **ECONOMICAL**—dry and quickly installed

Fires in high-rise buildings have shown the curtain wall spandrel/floor juncture to be highly vulnerable to the rapid spread of flame and smoke from floor to floor, unless it is adequately protected by effective fire-stopping insulation. Openings in the floor slab for utilities and services can have a similar result if left unsealed.

These U.S.G. Fire-Safety Systems are designed to provide perimeter fire protection at every building floor: THERMAFIBER Curtain Wall and Safing Insulations for sprandrel panels and floor edges, and THERMAFIBER Mineral Fireproofing for exterior columns and beams. THERMAFIBER Safing Insulation also functions as a positive fire-stop in floor and wall openings for telephone cables, ducts and piping. A secondary but important benefit of THERMAFIBER Safing is a high degree of between-floor sound attenuation.

THERMAFIBER Curtain Wall and Safing Insulations, already installed in vulnerable perimeter areas of some of the world's tallest buildings, work in combination to help confine the fire to the building interior, and to the floor of origin. Curtain Wall Insulation, applied to the inside of spandrel panels, helps prevent fire from breaking through to the outside. Safing Insulation, installed between floor slab and spandrels, impedes fire at the floor edge. Their use is inseparable because omitting one creates a bypass, rendering the other ineffective.

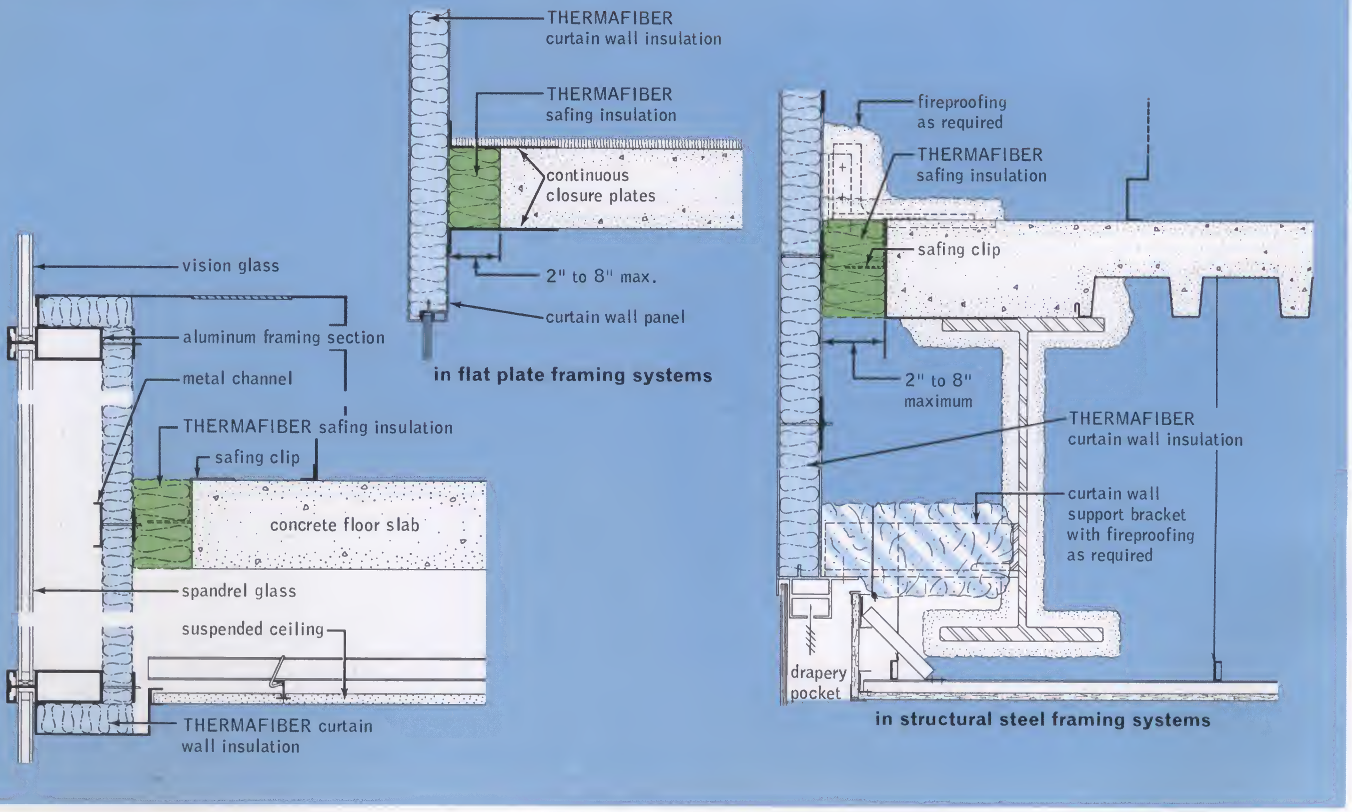
THERMAFIBER Mineral Fireproofing provides highly effective *dry* fireproofing for exterior protection of columns and beams of steel-framed buildings. It offers ratings up to four hours, in six UL Designs, assurance of consistently uniform quality, and clean, all-weather mechanical application.

advantages of fire-safety systems

THERMAFIBER Fire-Safety Insulations, composed of millions of tiny fibers spun from mineral raw materials, are noncombustible, with a melt-point of over 2,000°F, as defined by ASTM E119 test conditions. They emit no toxic fumes, and provide fire safety for a significant length of time, vastly superior to low-melt point insulations which allow passage of flame and hot gases in less than a half-hour. The mineral-type raw material also is moisture-resistant, mildew- and vermin-proof, noncorrosive and nondeteriorating, providing long-term durability and retention of insulating values.

These dry insulations are installed in units, allowing clean, positive mechanical attachment, even in areas difficult for other types of fire-protection to be installed. They contain no asbestos, and can be installed year-round, in any weather, without danger of spatter or pollution.

Typical Fire-Protection Applications


THERMAFIBER curtain wall insulation
THERMAFIBER safing insulation
continuous closure plates
2" to 8" max.
curtain wall panel
vision glass
aluminum framing section
metal channel
THERMAFIBER safing insulation
safing clip
concrete floor slab
spandrel glass
suspended ceiling
THERMAFIBER curtain wall insulation
fireproofing as required
THERMAFIBER safing insulation
safing clip
2" to 8" maximum
THERMAFIBER curtain wall insulation
curtain wall support bracket with fireproofing as required
drapery pocket

in flat plate framing systems

in structural steel framing systems

Copyright 1977, United States Gypsum Company

THERMAFIBER
Curtain Wall Insulation contains the fire at the spandrel

THERMAFIBER Curtain Wall Insulation provides spandrel panels and other metal-faced wall assemblies with excellent fire containment and thermal values. This mineral-fiber insulation is especially designed for quick mechanical attachment in metal-faced assemblies (see fire tests for specific attachment requirements). It is noncorrosive and suitable for aluminum, structural glass, porcelainized metal or other types of spandrel panels, both prefabricated and field-assembled—likewise for exterior column covers, window and track fillers. Its surface texture and color are not intended, however, as a finish *visible* through glass spandrels.

Available as a precision-preformed, semi-rigid blanket in nominal densities from 4.0 to 8.0 pcf in Regular (unfaced) Felt, and Foil/Skrim-Kraft Faced (FSK) Felt. Foil facings eliminate the need for separate vapor barriers, but do not affect fire containment ratings. FSK Foil provides extra durability for field installation during short or intermittent periods of inclement weather.

fire-tested performance

Since there are no established tests for a spandrel panel, United States Gypsum designed a testing procedure at its Research Center, using furnace time-temperature curves and recording procedures as specified in ASTM E119. The products tested were glass fiber and polyurethane insulations and THERMAFIBER Curtain Wall Insulation. Only the last-named effectively resisted the passage of flame and kept the aluminum spandrel panel temperature well below melt-point. Tests are described below (none reached an end point):

fire-containment test set-ups(1)

FIRE TEST USG 6-3-71
ALUMINUM SPANDREL CURTAIN WALL, 1-HR.
Construction: Exterior aluminum and steel panel bolted to top of wall frame and screw-attached to filler panel. 1½″ CW-70 Curtain Wall Insulation installed on pins on Z-runner near center of wall and steel studs at top of wall.

FIRE TEST USG 10-18-71
ALUMINUM SPANDREL CURTAIN WALL, 2-HR.
Construction: Aluminum spandrel panel 4′x6′9″, 0.247″ thick, with aluminum 8d nails spaced 1′2″ vertically and 1′ horizontally, tack-welded to surface. Spandrel panel attached to frame and 2″ CW-40 Foil-Faced Curtain Wall Insulation installed on pins with speed clips.

FIRE TEST WJE-72481
GLASS SPANDREL CURTAIN WALL, 2-HR.
Construction: Aluminum-framed glass spandrel panel, 4′8″ x 5′9″; ¼″ tempered glass; 2″ CW-90 Foil-Faced Curtain Wall Insulation installed on pins with speed clips.

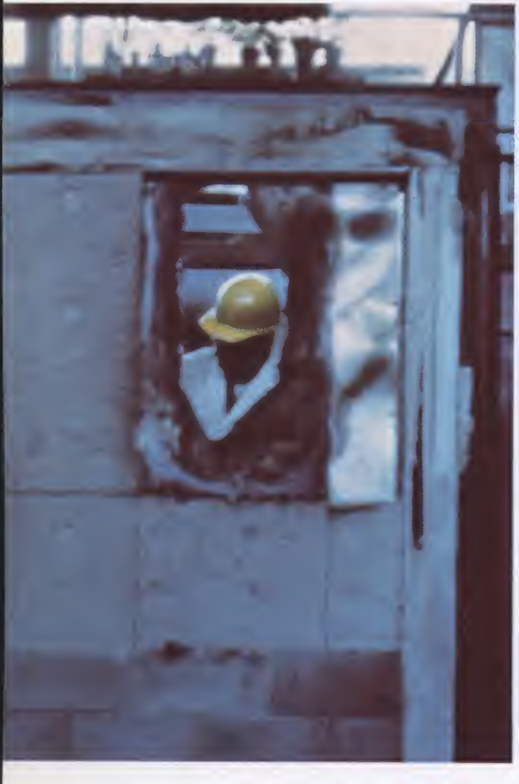
FIRE TEST USG 10-30-71
ALUMINUM SPANDREL CURTAIN WALL, 3-HR.
Construction: Aluminum spandrel panel 4′x6′9″, 0.123″ thick, with ⅛″ dia. aluminum pins attached to interior face. Pins spaced 1′2″ vertically and 1′ horizontally. Spandrel panel attached to frame and 3″ CW-70 Foil-Faced Curtain Wall Insulation installed on pins with speed clips.

FIRE TEST USG 2-18-74
ALUMINUM SPANDREL CURTAIN WALL, 5-HR.(2)
Construction: Aluminum spandrel panel 5′x6′8″, ⅛″ thick, bolted to aluminum angle frame. 2″ CW-90 Curtain Wall Insulation installed on aluminum pins with speed clips, pins welded to panel on approximately 12″ centers each way.

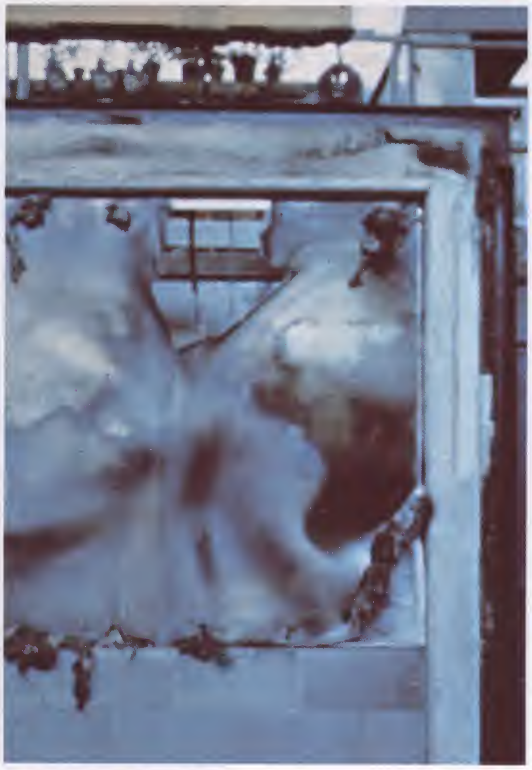
(1) Times shown not to be construed as end points.

(2) Conducted to establish an end-point for THERMAFIBER Insulation in a typical curtain wall assembly, but after 5 hr. 5 min. without failure or physical change (except color), test was terminated to avoid furnace damage.

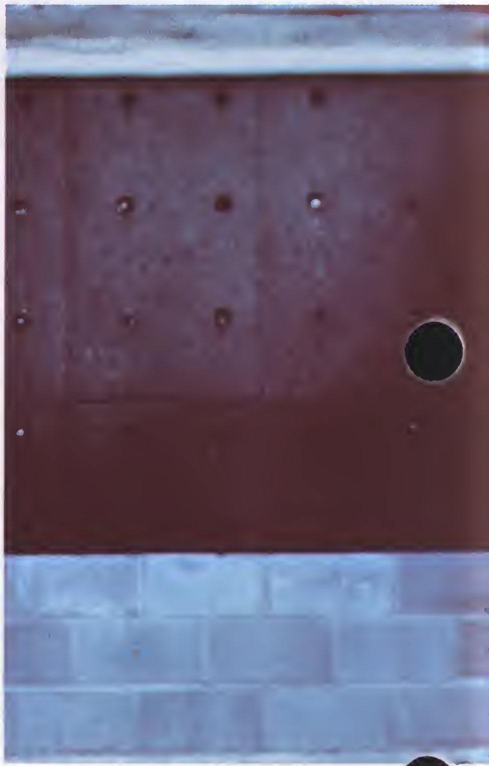
Fire Resistance of Curtain Wall Insulation Materials



Polyurethane foam—disintegration within 5 minutes.

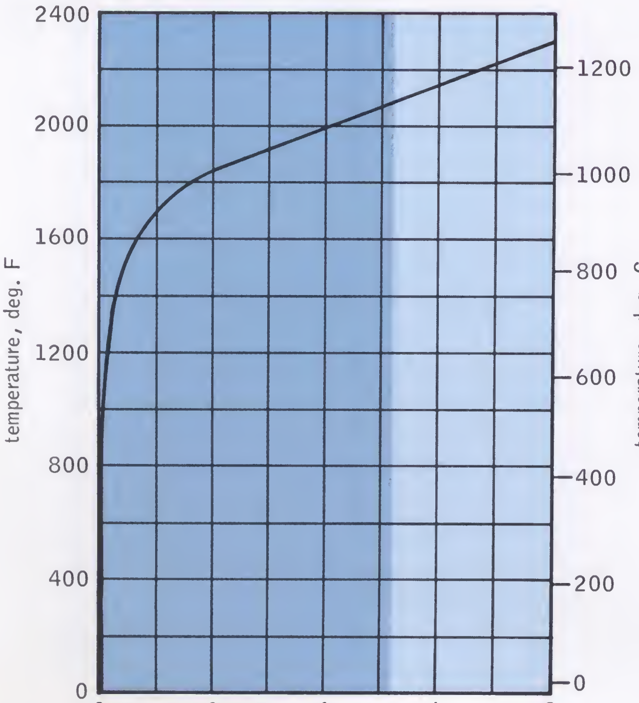


Glass fiber—melting within 26 minutes.



THERMAFIBER Mineral Fiber—intact after 5-hr. 5-min. exposure to fire.

ASTM E119 Time/Temperature



thermal performance data

The high thermal efficiency of the THERMAFIBER Curtain Wall Insulation gives added value. It helps eliminate condensation problems, is vermin-proof, moisture-resistant and mildew-proof.

THERMAFIBER Curtain Wall Insulation product	k-factor @ 75°F. Btu/hr./ sq. ft./°F./inch	"U" value of insulated spandrel*		
		1″ thick	1½″ thick	2″ thick
CW 40	0.25	—	—	0.11
CW 70	0.24	0.20	0.14	0.11
CW 90	0.23	0.19	0.13	0.10

*Insulation attached direct to metal spandrel panel. "U" includes inside and outside air films.

fire-containment time comparison(1)

INSULATION TYPE	ASTM E119 Test Time (2)
High-melt point	
THERMAFIBER Curtain Wall Insulation	5 hr. 5 min. (3)
Low-melt point	
Glass fiber (6-pcf dens.)	26 min. (4)
Glass fiber (4-pcf dens.)	12 min. (4)
Polyurethane (fire-resistant type)	2 min. (4)

(1) Fire containment of a curtain wall is its ability to retard the spread of fire to other floors, also its intensity, by restricting the amount of oxygen.

(2) Time duration of test to point at which panel is breeched, allowing passage of flame and hot gases, test controlled in accordance with ASTM E119 time/temperature curve.

(3) Test of curtain wall panel with insulation exposed to fire, witnessed by The Consulting Engineers Group Inc., Feb. 18, 1974. No melting or disintegration after 5 hr. 5 min. at 2,080°F., not construed as end points but test terminated to avoid furnace damage.

(4) Test of curtain wall panel with insulation exposed to fire, witnessed by Wiss, Janney, Elstner & Associates, Inc., Oct. 16-20, 1972.

THERMAFIBER
Safing Insulation confines the fire to floor of origin

THERMAFIBER Safing Insulation, installed in combination with Curtain Wall Insulation, provides an effective 3-hr. fire barrier at the curtain wall opening between floor slab edge and spandrel panel, to retard the spread of fire to the floor above. Used in the same way it seals all other floor openings, through which electrical/mechanical systems penetrate, for complete fire containment. It is available as a 4-pcf density precision-preformed, semi-rigid mineral fiber felt, 24″ wide and 4″ thick. THERMAFIBER Safing Insulation can be quickly installed on support brackets or safing clips, yet completely seals the opening.

fire-tested performance

At its Research Center, U.S.G. also originated a testing procedure for safing materials. Results of these tests are now accepted by code bodies nationwide. THERMAFIBER Safing Insulation, 4″ thick, was tested for over 3 hrs. without deterioration or failure of its fire-stopping ability.

In this test procedure, using time/temperature durations specified in ASTM E119, the furnace top simulates the floor slab and the furnace face is closed with a typical curtain wall spandrel panel assembly. The THERMAFIBER Safing Insulation protected so well that cotton waste, placed on the unexposed side near the end of the test, did not ignite. Inspection after the test showed that THERMAFIBER still retained its full thickness—still effective as a fire-stop.

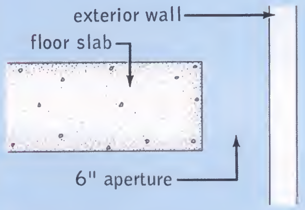
sound-tested performance

The curtain wall spandrel/floor juncture, in addition to being vulnerable to fire, can also be a flanking path for sound transmission between floors. THERMAFIBER Safing Insulation provides excellent sound attenuation at this point. In tests at the U.S.G. Acoustical Research Facility, a simulated 6″ concrete floor with 4″ thick, 4-pcf density THERMAFIBER Safing installed between uncaulked steel cover plates, rated STC 49. This performance was superior to that of 2-psf sheet lead in the same assembly—and not far below poured concrete at STC 54! Test data available on request. Details show comparative performance of THERMAFIBER Safing and other typical methods.

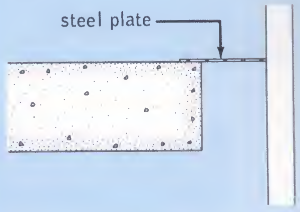
Fire resistance test—
glass fiber safing (6-pcf) burning through.

THERMAFIBER Safing restores the positive fire barrier at floor penetrations such as telephone cable and air ducts.

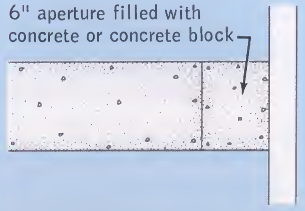
STC 14 . . .
no fire-stop; virtually no sound attenuation



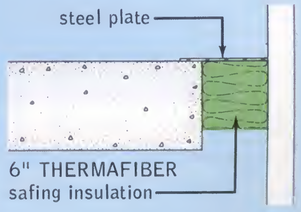
STC 28 . . .
inexpensive—but no fire-stop, and poor sound attenuation



STC 54 . . .
full fire-stop, best sound attenuation—but expensive



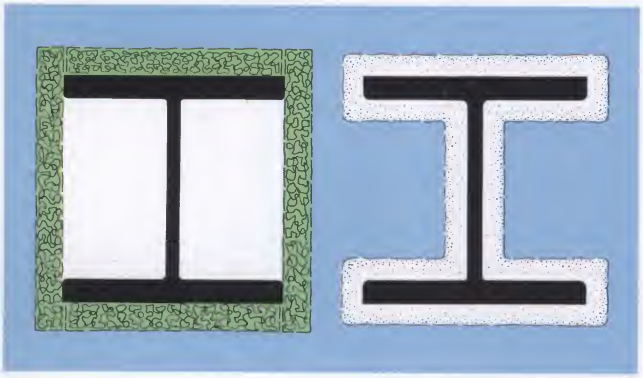
STC 45 . . .
(STC 38 without steel plate)
full fire-stop, excellent sound attenuation—and economical



THERMAFIBER
Mineral Fireproofing protects the strength of structural steel

THERMAFIBER Mineral Fireproofing provides effective fire protection for the columns and beams of steel-framed structures, with six UL Designs offering fire ratings of up to four hours. It is a semi-rigid felt, noncorrosive to steel and aluminum, more effective than many other board materials and with exceptional durability far superior to spray-on materials.

THERMAFIBER Mineral Fireproofing encloses the structural member in a box-section shape easily finished with a variety of surfacing materials (it is not intended as a permanently exposed surface). The box shape has less area to transmit heat than surface-applied insulation as shown here.



fast, clean application

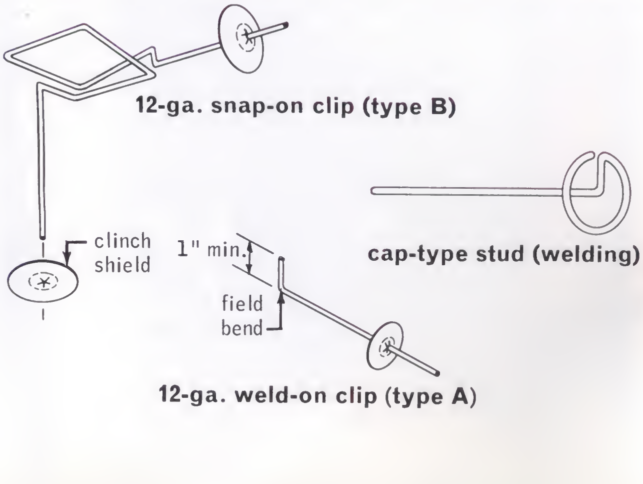
Installation is clean and simple, with 10 or 12-ga. wire weld-on studs, or snap-on flange clips and 1½″ diam. clinch shields, or with ⅛″ diam. cap-type steel studs welded through fireproofing. No curtains are required to prevent over-spray and atmospheric pollution, no heating during cold weather. Hard-to-get-at areas, such as the openings between flutes of floor decking above supporting beams, are almost impossible to reach with spray-on types—and often are inadequately covered or missed altogether. With THERMAFIBER Mineral Fireproofing, full protection is easily installed, and this mineral material contains no asbestos.

Limitation: Exposed columns should have suitable surfacing. Mineral fireproofing dries quickly, but should be protected from moisture-saturation and extended exposure to elements.

Dry fireproofing surrounds beam supporting steel floor.

Flange clips and clinch shields secure fireproofing to column.

All three THERMAFIBER Fire Safety Systems assure complete fire protection of perimeter building components: *(above)* foil-faced Curtain Wall Insulation is already in place behind the spandrel, as workman seals off edge of floor slab with Safing, and *(below)* a spandrel beam is encased in Mineral Fireproofing.



fire ratings & UL Designs

fire rating	description	UL Design no.	column or beam size
4 hrs.	Mineral Fireproofing 2″ thick around column attached with ⅛″ steel wire studs welded to column 24″ o.c. max.	X304/ X202	W14 X228
3 hrs.	Mineral Fireproofing double-layer 2″ thick around column attached with 12-ga. flange clips and clinch shields spaced 16″ o.c. max.	X306	W10 X49
3 hrs.†	Mineral Fireproofing double-layer 2″ thick around beam attached with 12-ga. flange clips and clinch shields spaced 12″ o.c. max.—2½″ concrete on cellular steel floor units.	N304	W8 X24

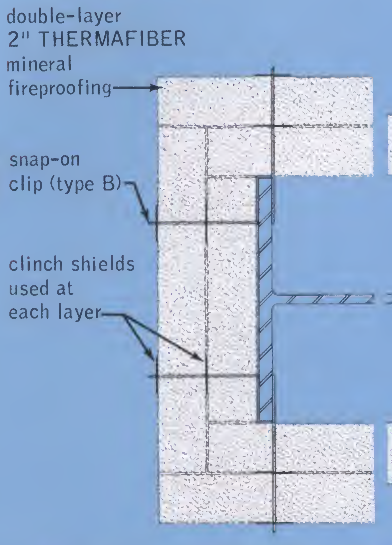
†Restrained beam rating; unrestrained beam rating is 2 hrs.

fire rating	description	UL Design no.	column or beam size
2 hrs.	Mineral Fireproofing 2½″ thick around column attached with 12-ga. flange clips and clinch shields spaced 24″ o.c. max.	X305	W10 X49
2 hrs.‡	Mineral Fireproofing double-layer 2″ thick around beam attached with 12-ga. flange clips and clinch shields spaced 16″ o.c. max.—3¼″ concrete on fluted steel floor units.†	D915	W8 X13
2 hrs.‡	Mineral Fireproofing 2″ thick around beam attached with 12-ga. flange clips and clinch shields spaced 12″ o.c. max.—2½″ concrete on fluted steel floor units.	N305 N304‡	W8 X24

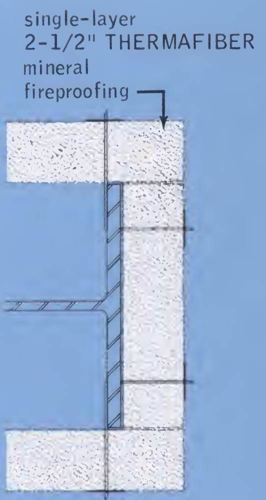
†Restrained beam rating; unrestrained beam rating is 2 hrs. ‡Rating 1½ hrs. if cellular steel floor units are used.

UL Design details

column fireproofing

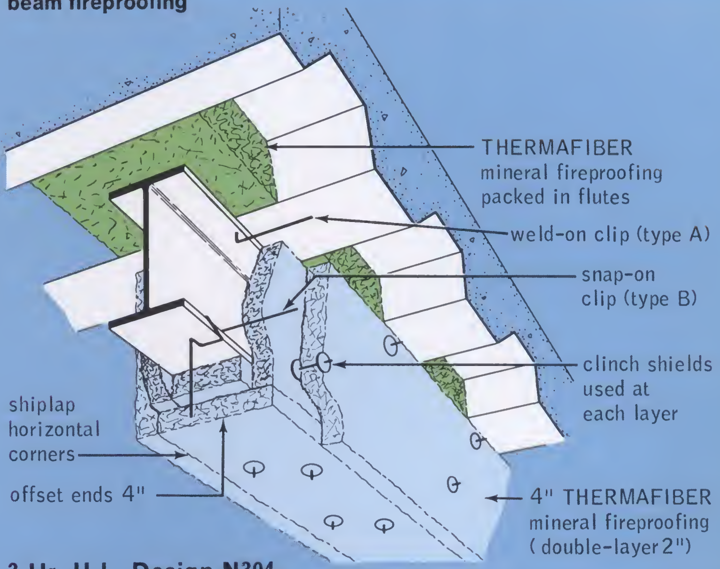


3-Hr. UL Design X306



2-Hr. UL Design X305

beam fireproofing



3-Hr. U.L. Design N304
2-Hr. U.L. Design D915

physical properties

fire resistance

Thermafiber Fire-Safety Insulations are rated noncombustible in accordance with ASTM E136 and NFPA definition.

fire hazard classification per ASTM E84

product designation	flame spread	fuel contributed	smoke developed
CW Regular (unfaced)	15	0	0
CW Foil-Faced (FSK)	20	15	0
Safing	15	0	0
Mineral Fireproofing	15	0	0

thermal conductivity

product designation	"k"-factor @ 75°F. Btu/hr./sq. ft./°F./in.	"U" value of spandrel with insulation(1) 1″ thick	1½″ thick	2″ thick
CW 40	0.25	—	—	0.11
CW 70	0.24	—	0.14	0.11
CW 90	0.23	0.19	0.13	0.10
Safing	0.25	—	—	—
Mineral Fireproofing	0.23	—	—	—

(1) Attached direct to metal spandrel panel, "U" based on inside and outside air films.

physical data

product designation	nom. density —pcf	min. thickness	container size	avg. wt., lb./MBF, in:		application method
				sleeve or bag(1)	ctn.	
CW 40 (F)	4.0	2″	per customer specification	400	440	see tests for req'd. attachment
CW 70 (F)	6.0	1½″		570	610	
CW 90 (F)	8.0	1″		730	770	
Safing	4.0	4″	per customer specification	400	440	brackets or safing clips
Mineral Fireproofing	8.0	2″, 2½″	per customer specification	780	800	snap-on wire clips or weld-on studs

(1) Consult U.S.G. Sales Engineer for limitations on shipments in bags.

specification compliance

Products meet Federal Specifications HH-I-521E (Curtain Wall Insulation as Types I and III, Mineral Fireproofing as Type I—with waiver of identification-marking requirement; and Safing Insulation as Type I, Class A); and HH-I-558B, Form A, Classes 1 and 2. THERMAFIBER Safing is approved for use in New York City by Board of Standards & Appeals, 619-48-SM and 39-74-SM. THERMAFIBER Mineral Fireproofing is approved for use in New York City under BSA 619-48-SM and accepted by MEA 70-71-M (4-hr. col.), 28-75-M (3-hr. col.), 25-74-M (2-hr. col.), 24-74-M and 138-75-M (beams).

sizes & availability from U.S.G. plants

product designation	S. Plainfield, N.J.				Wabash, Ind.				Tacoma, Wash.				Corsicana, Tex.			
	min. thick.	max. thick.	width	lgth.	min. thick.	max. thick.	width	lgth.	min. thick.	max. thick.	width	lgth.	min. thick.	max. thick.	width	lgth.
CW 40(1)	2″	5″	12″ to 24″	60″	2″	5″	12″ to 48″	60″	–	–	–	–	–	–	–	–
CW 70(1)	1½″	3½″		60″	1½″	3½″		60″	–	–	–	–	–	–	–	–
CW 90(1)	1″	2½″		60″	1″	2½″		60″	–	–	–	–	–	–	–	–
Safing	4″	4″	24″	60″	2″	4″	24″	48″ & 60″	4″	4″	24″	44½″	4″	4″	24″	45″
Mineral Fireproofing	2″	2½″	24″	60″	2″	2½″	24″	48″ & 60″	–	–	–	–	–	–	–	–

NOTE: Dimension tolerances—width ±⅛″, length ±½″, thickness —⅛″, +¼″ (except —⅛″, +⅜″ for 1″ thick CW 90 at S. Plainfield). (1) Aluminum-foil facing available from Wabash or S. Plainfield plants.

architectural specifications

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications
All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials
All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 design conditions
(Curtain Wall) (Safing) (Mineral Fireproofing) insulation shall be (1) (2) (3) (4)-hr. fire-tested under simulated field conditions, in accordance with ASTM E119.

Part 2: products

2.1 materials

2.1.1 curtain wall insulation: THERMAFIBER Curtain Wall, Type ( ), (Regular) (FSK-Foil Faced) blankets, ( ) thick, ( ) wide, ( ) long.

2.1.2 safing insulation: THERMAFIBER Safing, 4″ thick, ( ) wide, ( ) long, 4-pcf min. density, (with foil facing) (with galvanized steel safing clips) (with fire-resistant adhesive).

2.1.3 structural fireproofing: THERMAFIBER Mineral Fireproofing, (2″) (2½″) thick, 24″ wide, (48″) (60″) long.

Part 3: execution

3.1 curtain wall insulation application
Mechanically attach curtain wall insulation at approx. 12″ o.c. to exterior wall. (Install foil-faced insulation with foil facing inward.) Butt ends and edges closely together and fill all voids.

3.2 safing insulation application
Install safing insulation of proper size on safing clips spaced as needed, 24″ o.c. max., in safe-off area between curtain walls and floor slabs, leaving no voids. Compress and install on wire hangers in all openings in floor slabs to seal completely around telephone cables, ducts, piping or other utilities.

3.3 column fireproofing application

3.3.1 UL Design X304/X202-4 hrs.
For all W14X228 columns, install THERMAFIBER Mineral Fireproofing 2″ thick around column using ⅛″ diam. steel wire studs welded to column after placement of fireproofing. Space studs 2″ from top and bottom of assembly, 24″ o.c. vertically and at least ¾″ from vertical edges.

3.3.2 UL Design X306-3 hrs.
Install 2″ thick THERMAFIBER Mineral Fireproofing in double layer around column. Shiplap vertical corner joints and offset horizontal joints between layers. Impale insulation on 12-ga. wire snap-on clips friction-fitted over column flange and secure each layer with clinch shields. Space clips max. 16″ o.c. and 3½″ from ends of insulation.

3.3.3 UL Design X305-2 hrs.
Install THERMAFIBER Mineral Fireproofing 2½″ thick around column. Impale insulation on 12-ga. wire snap-on clips friction-fitted over column flange and secure with clinch shields. Space clips max. 24″ o.c. and 3¾″ from ends of insulation.

3.4 beam fireproofing application
Install 2″ thick THERMAFIBER Mineral Fireproofing in double layer on sides and bottom of beam. Shiplap horizontal corner joints and offset joints between layers at least 4″. Impale insulation on 12-ga. wire clips friction-fitted or welded to beam flanges and secure each layer with clinch shields. Space clips max. (12″) (16″) o.c. and 2″ from ends of insulation. Stuff additional insulation between crests of fluted deck and beam.

For further information on these products, contact:
U.S.G. CONSTRUCTION PRODUCTS DIVISION OFFICES—Tarrytown, N.Y. (914) 332-0800; Atlanta, Ga. (404) 393-0770; Chicago, Ill. (312) 321-4100; Los Angeles, Calif. (213) 388-1171. U.S.G. MINERAL FIBER DIVISION OFFICES—Birmingham, Ala. (205) 252-6432; Wabash, Ind. (219) 563-2111; S. Plainfield, N.J. (201) 756-6776; Corsicana, Tex. (214) 874-4781; Tacoma, Wash. (206) 922-8756.

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BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

SA
805

USG Curtain Wall Systems

for design flexibility, tested performance and architectural beauty

system folder

8.14/Un

UNITED STATES GYPSUM
1977—1
8 P
CURTAINWALL SYSTEM
steel stud & facings

on cover:
FIRST FEDERAL SAVINGS &
LOAN Building, Greenville, S.C.
Architect: FREEMAN, WELLS & MAJOR

MERRIMACK PLAZA APARTMENTS, Lowell, Mass.
Architect: STEFFIAN, STEFFIAN & BRADLEY, INC.

MONTGOMERY WARD Store, Mesquite, Tex.
Architect: OMNIPLAN ARCHITECTS HARRELL & HAMILTON

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. . . lightweight framing systems for exterior walls (non-load bearing)

description

USG Exterior Curtain Wall systems offer a wide range of effects for non-load bearing exterior walls. Utilizing conventional materials, methods and equipment, plus trades already on the job, these improved systems have been specified in all parts of the nation.

framing systems

USG Steel Studs, modified channel types roll-formed from five thicknesses of galvanized steel, provide the wall framing with interior drywall, veneer and conventional plaster systems. They are an ideal back-up for brick veneer assemblies, reducing dead load 25% in comparison to concrete block backings. Studs are available in nine depths, five thicknesses, giving a variety of sizes. The wide choice of stud sizes and spacings accommodates wall heights to 33′-3″, wind loads to 40 psf (125 mph), and a variety of building modules.

Studs are anchored at top and bottom in specially designed runners, and THERMAFIBER Insulation is inserted in the cavity.

An alternate framing system uses USG C-H Studs, J-Runners and Gypsum Liner Panels to provide sturdy, quickly erected curtain walls. Studs and runners are available in 2½″ and 4″ widths. USG Gypsum Liner Panels have a special fire-resistant core encased in water-resistant paper. Wall heights to 21′-6″, wind loads to 40 psf. All components except curtain wall skin may be erected from inside the building.

exterior surfaces

Exterior surfaces may be unit masonry, portland cement-lime stucco or various decorative panels or siding materials. Brick or other masonry units are laid with a mortar of portland cement and BONDCRETE Mason's Lime and secured with wall ties screw-attached through the sheathing to steel studs. This system offers speedier building enclosure, the superior weather protection of a double-cavity wall and greater variety of insulation options.

Portland cement-BONDCRETE Lime stucco is applied in three coats to a 1″ thickness over 3.4-lb. galvanized metal lath. Self-furring metal lath is screw-attached to steel studs through USG Gypsum Sheathing.

Ceramic, aggregated or porcelain-enameled panels, prefinished metal siding and other dry exterior facings weighing up to 8 psf are applied over sheathing and screw-attached to studs.

For the C-H Stud System, curtain wall panels are independently supported by attaching to horizontal girts fastened to the structure.

interior surfaces

Interior surfaces may be gypsum drywall, high-strength veneer plaster or conventional plaster. Hundreds of variations in finishes ranging from smooth trowel to oriental-style textures, painted or fabric-covered, are available for interior design.

With *gypsum drywall*, Foil-Back SHEETROCK Gypsum Panels, ½″ or ⅝″ thick, are screw-attached to the steel studs. Foil-Back SHEETROCK FIRECODE Gypsum Panels provide additional resistance to fire exposure, are used in assemblies where a fire rating is required.

Veneer plaster interiors have Foil-Back IMPERIAL Gypsum Base screw-attached to steel studs. IMPERIAL Plaster or DIAMOND Interior Finish is applied 1/16″ to 3/32″ thick over this large-size base.

For *conventional plaster* interiors, Foil-Back ROCKLATH Plaster Base is clip or screw-attached to studs and RED TOP Gypsum Plaster is applied ½″ thick over the base.

function and utility

USG Curtain Wall System adapt easily to basic design concepts and may be used as vertical spandrels or infill panels and in ledger-supported systems. They are suitable for many types of structures such as office buildings, schools, shopping centers, motels, hotels and apartments.

Design Freedom—Exterior stucco surfaces for this framing offer unlimited opportunity for creative design through the textural expression of smooth monolithic surfaces or random sculptural relief. Color and texture can be varied by the addition of coarse, colored aggregates which contrast boldly with brick, glass and concrete. The great range of possibilities allows the architect a wide latitude of design expression.

Versatility—Interior and exterior facings in various combinations offer the architect and owner a greater selection of surface finishes to meet specific functional and esthetic needs.

Fire Resistance—2-hour rating available (see table).

Sound Control—The dampening effect of air space and insulation within the framing reduces the airborne street noise transmitted to the interior.

Thermal Insulation—High thermal performance meets the "All-Weather Comfort Standard" for electrically heated and air conditioned buildings (see page 10 for specific heat transfer characteristics).

Light Weight—These systems reduce dead load by 25% in brick masonry walls and up to 66% in textured panel assemblies, thus reducing structural foundation requirements.

Weather Resistance—Confirmed by tests, the systems meet air and water infiltration standards set by HUD and NAAMM for 40 psf wind pressure which is equivalent to a wind velocity of 125 mph. Where moisture may penetrate stucco and masonry exteriors, a weather-resistive barrier over edges and joints of gypsum sheathing may be required for protection.

Adaptability—USG Curtain Walls can be used in most steel or reinforced concrete constructions where the load is borne by the structural framing and not the curtain wall.

Economy—No new or unusual materials or techniques are required. All components and applications procedures are familiar to mechanics.

limitations

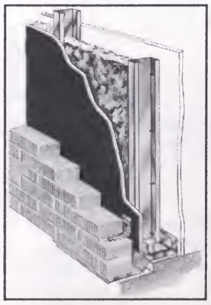
1. Non-load bearing constructions.

2. Limiting heights, maximum stud and runner attachment spacing for up to 40 psf wind loading are shown in Technical Data, pages 8 and 9.

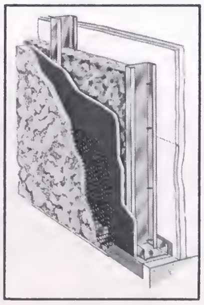
3. Certain recommendations covering shadowing and spotting, expansion and contraction, air and water infiltration must be followed for satisfactory performance of USG Curtain Wall Systems (see Specifications, page 10).

fire rating

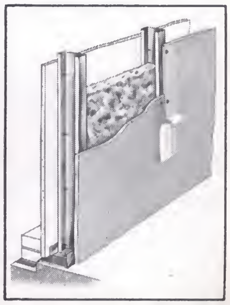
description	test no.	fire rating
358ST10 steel studs 16″ o.c.—½″ gypsum sheathing —self-furring metal lath—1″ cement-lime stucco exterior—3″ THERMAFIBER metal stud blankets between studs—⅝″ Foil-Back SHEETROCK FIRECODE "C" gypsum panels or IMPERIAL FIRECODE "C" gypsum base and 1/16″ IMPERIAL plaster interior	T-4851-OSU	2 hrs.



masonry exterior



stucco exterior



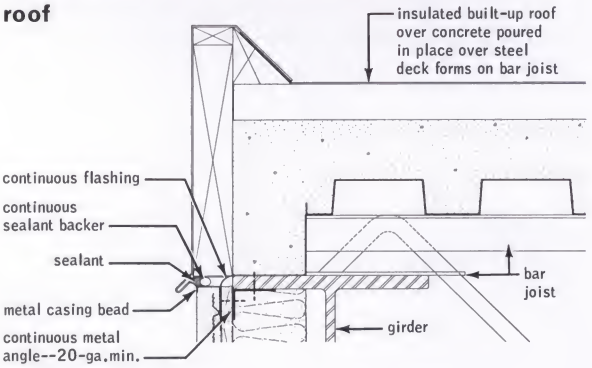
gypsum drywall interior

details

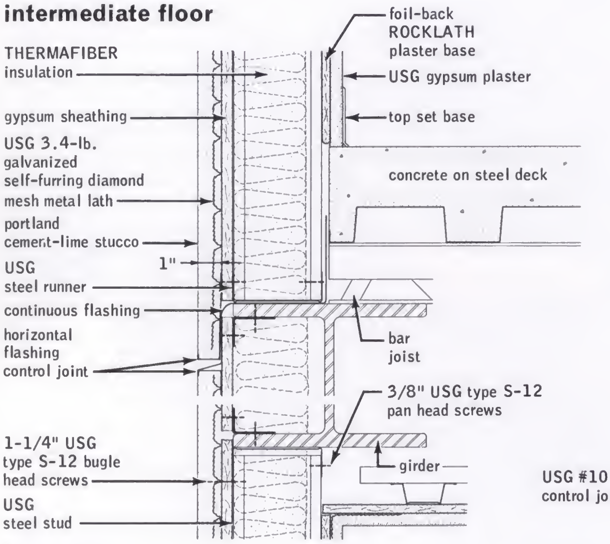
scale: 1½″=1′-0″

exterior stucco/steel frame

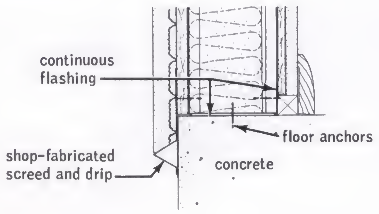
roof

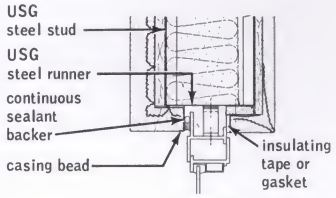

insulated built-up roof over concrete poured in place over steel deck forms on bar joist
continuous flashing
continuous sealant backer
sealant
bar joist
metal casing bead
girder
continuous metal angle--20-ga.min.

intermediate floor

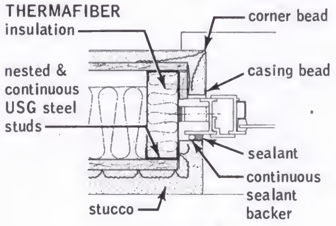

foil-back ROCKLATH plaster base
THERMAFIBER insulation
USG gypsum plaster
gypsum sheathing
top set base
USG 3.4-lb. galvanized self-furring diamond mesh metal lath
concrete on steel deck
portland cement-lime stucco
1"
USG steel runner
continuous flashing
bar joist
horizontal flashing control joint
3/8" USG type S-12 pan head screws
1-1/4" USG type S-12 bugle head screws
girder
USG steel stud

foundation

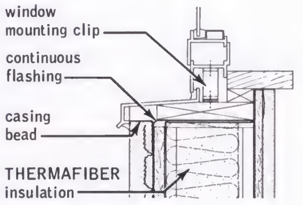




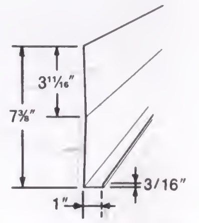
head


THERMAFIBER insulation
corner bead
nested & continuous USG steel studs
casing bead
sealant
continuous sealant backer
stucco

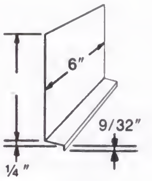
jamb



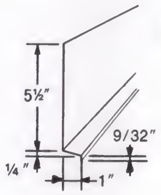
sill



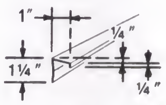
fluted casing bead



drip cap splice plate

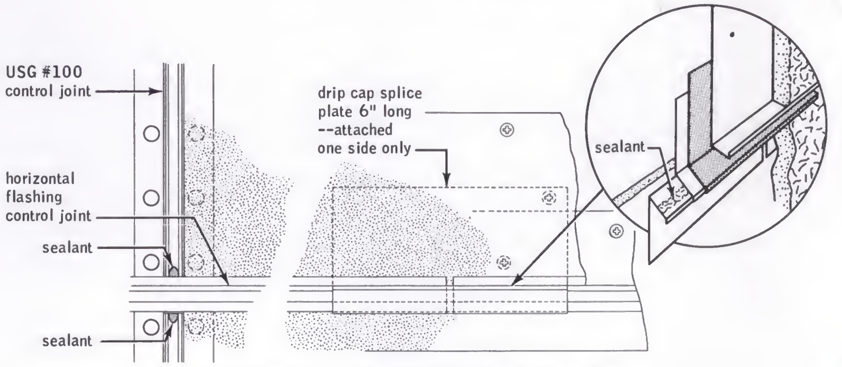


drip cap



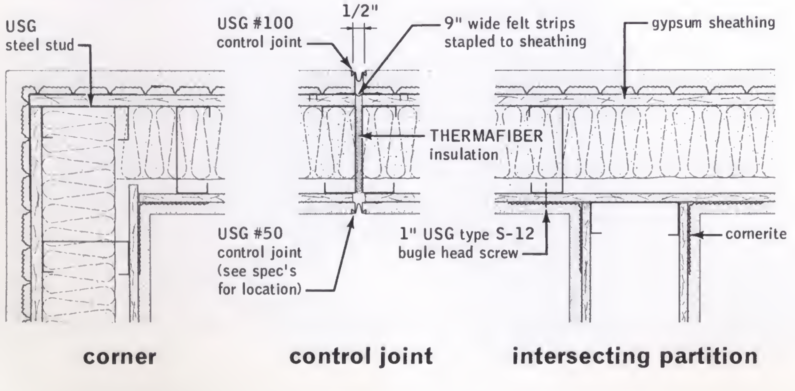
casing bead

horizontal flashing control joint


USG #100 control joint
drip cap splice plate 6" long --attached one side only
sealant
horizontal flashing control joint
sealant
sealant

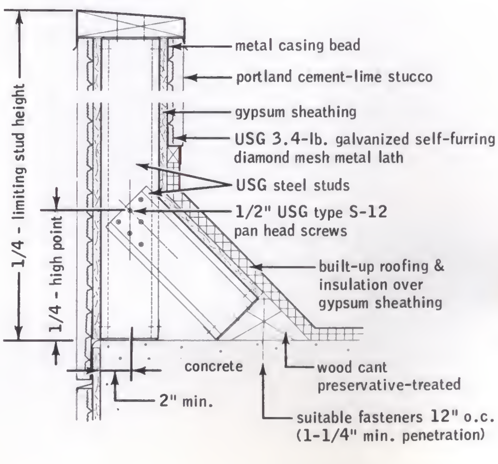
elevation—control joint intersection

wall plan sections


USG steel stud
USG #100 control joint
1/2"
9" wide felt strips stapled to sheathing
gypsum sheathing
THERMAFIBER insulation
USG #50 control joint (see spec's for location)
1" USG type S-12 bugle head screw
cornerite

corner **control joint** **intersecting partition**

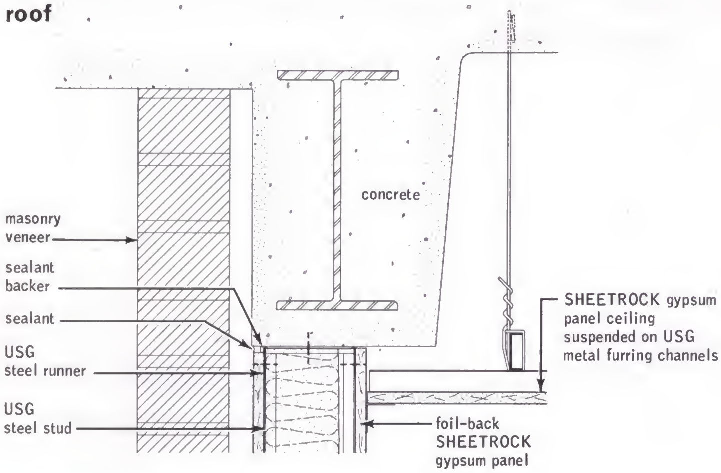
parapet


metal casing bead
portland cement-lime stucco
gypsum sheathing
USG 3.4-lb. galvanized self-furring diamond mesh metal lath
USG steel studs
1/2" USG type S-12 pan head screws
1/4 - limiting stud height
1/4 - high point
built-up roofing & insulation over gypsum sheathing
concrete
wood cant preservative-treated
2" min.
suitable fasteners 12" o.c. (1-1/4" min. penetration)

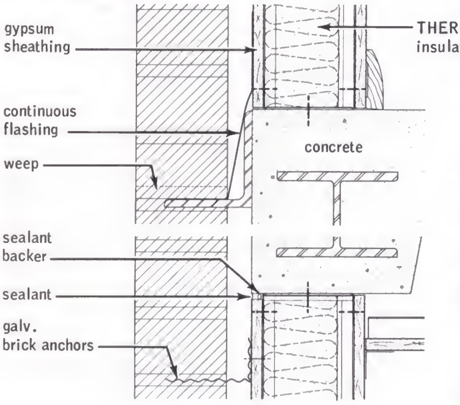
details

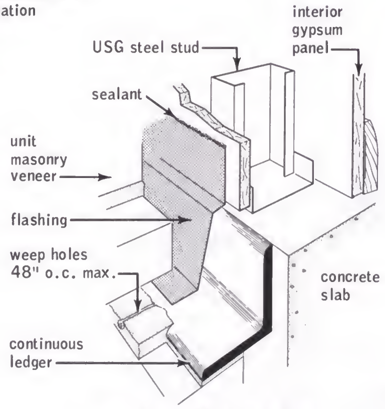
exterior masonry veneer/steel frame

roof


concrete
masonry veneer
sealant backer
sealant
USG steel runner
USG steel stud
SHEETROCK gypsum panel ceiling suspended on USG metal furring channels
foil-back SHEETROCK gypsum panel

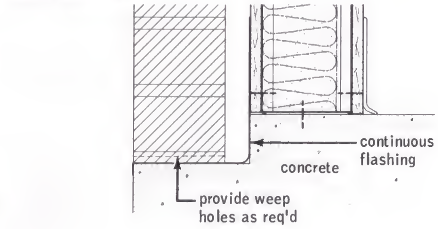
intermediate floor



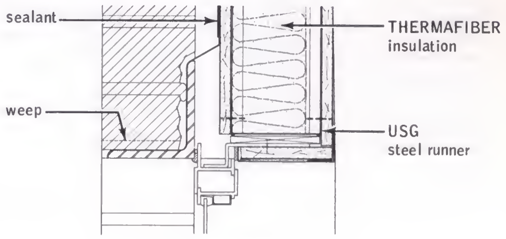


horizontal flashing

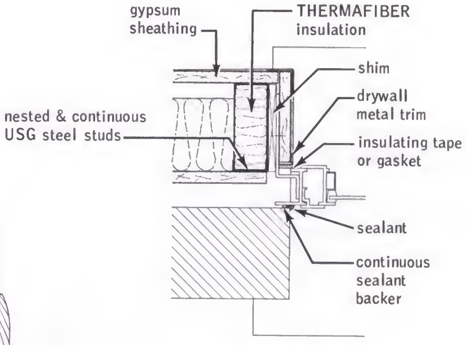
foundation



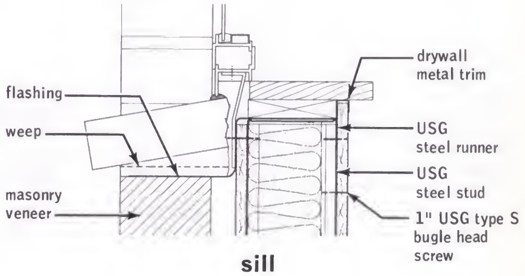
window frame sections



head

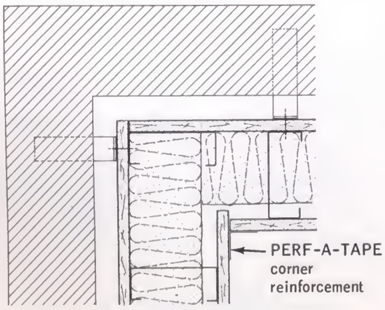

gypsum sheathing
THERMAFIBER insulation
shim
drywall metal trim
nested & continuous USG steel studs
insulating tape or gasket
sealant
continuous sealant backer

jamb

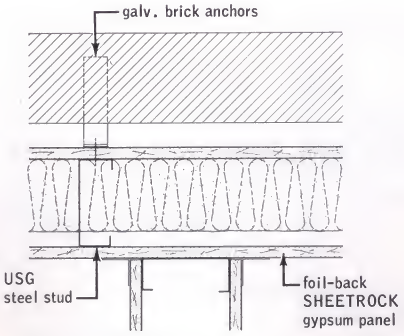


sill

wall plan sections

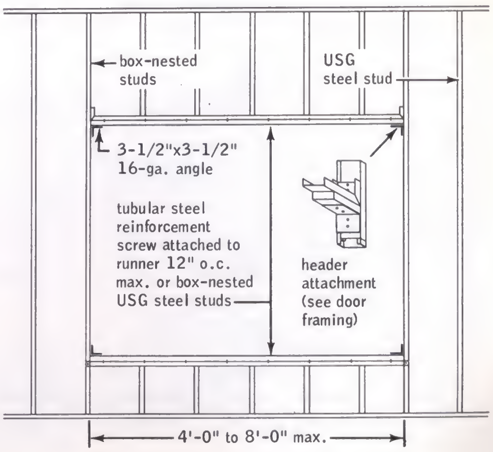


corner



intersecting partition

wall elevation—window opening
USG steel stud system

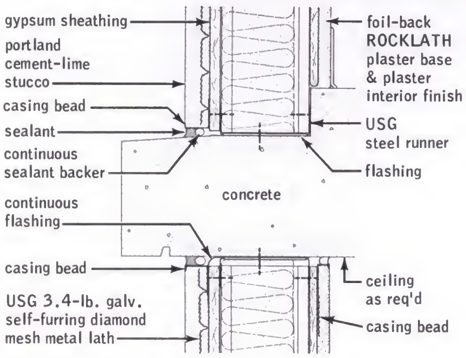

box-nested studs
USG steel stud
3-1/2"x3-1/2" 16-ga. angle
tubular steel reinforcement screw attached to runner 12" o.c. max. or box-nested USG steel studs
header attachment (see door framing)
4'-0" to 8'-0" max.

details

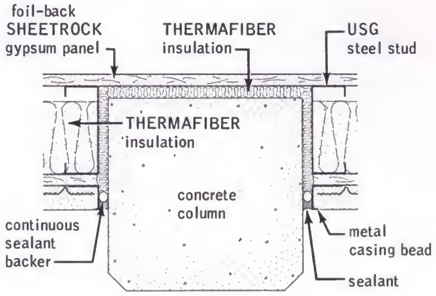
scale: 1½"=1'-0"

exterior stucco/concrete frame

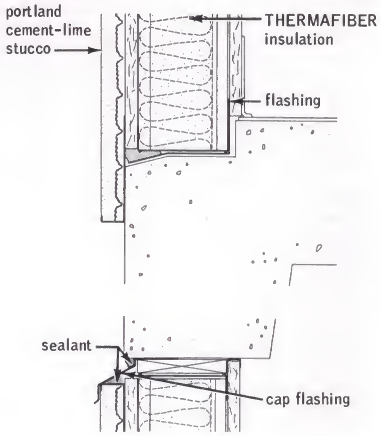
intermediate floor


gypsum sheathing
portland cement-lime stucco
casing bead
sealant
continuous sealant backer
continuous flashing
casing bead
USG 3.4-lb. galv. self-furring diamond mesh metal lath
concrete
foil-back ROCKLATH plaster base & plaster interior finish
USG steel runner
flashing
ceiling as req'd
casing bead

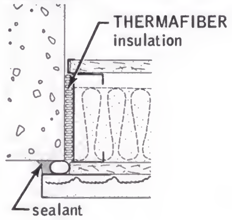
column



intermediate floor

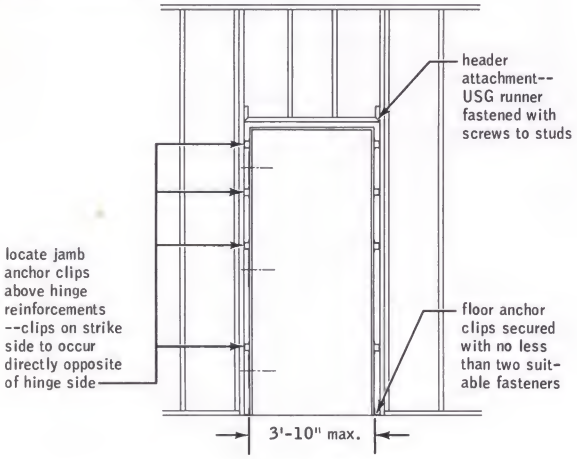


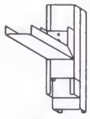
column



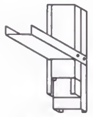
door frames

wall elevation—50-lb. door max.
USG steel stud system


header attachment--USG runner fastened with screws to studs
locate jamb anchor clips above hinge reinforcements --clips on strike side to occur directly opposite of hinge side
floor anchor clips secured with no less than two suitable fasteners
3'-10" max.

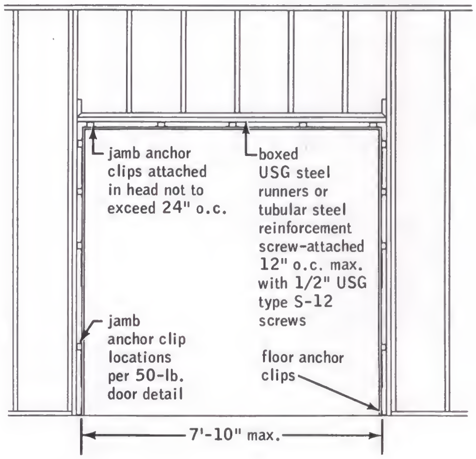


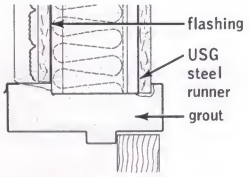
header attachment



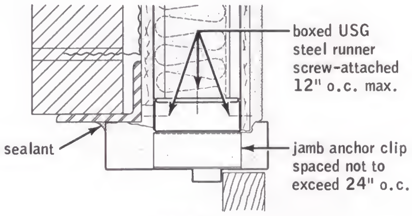
alternate header attachment

wall elevation—200-lb. doors
USG steel stud system

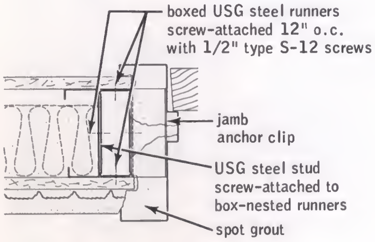

jamb anchor clips attached in head not to exceed 24" o.c.
boxed USG steel runners or tubular steel reinforcement screw-attached 12" o.c. max. with 1/2" USG type S-12 screws
jamb anchor clip locations per 50-lb. door detail
floor anchor clips
7'-10" max.



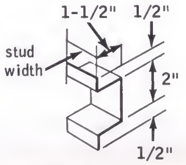
head
50-lb. door


boxed USG steel runner screw-attached 12" o.c. max.
sealant
jamb anchor clip spaced not to exceed 24" o.c.

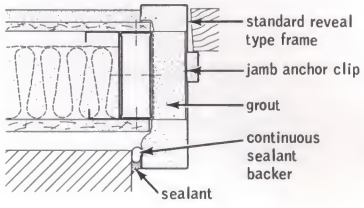
head
50 to 200-lb. door


boxed USG steel runners screw-attached 12" o.c. with 1/2" type S-12 screws
jamb anchor clip
USG steel stud screw-attached to box-nested runners
spot grout

jamb
50-lb. door



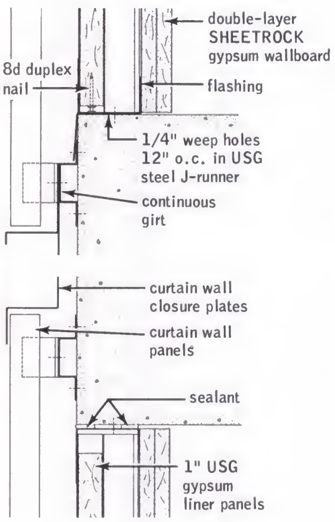
jamb anchor clip

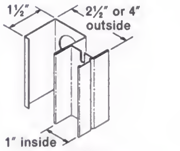


jamb
50 to 200-lb. door

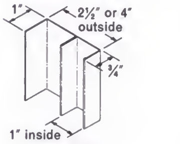
details

C-H stud system

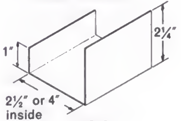

double-layer SHEETROCK gypsum wallboard
8d duplex nail
flashing
1/4" weep holes 12" o.c. in USG steel J-runner
continuous girt
curtain wall closure plates
curtain wall panels
sealant
1" USG gypsum liner panels



USG
steel C-H stud

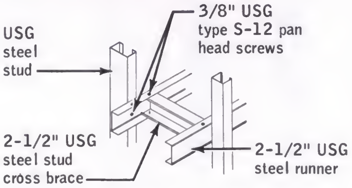


USG
steel E-stud

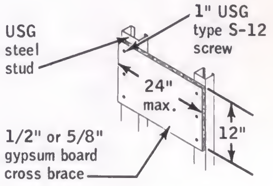


USG
steel J-runner

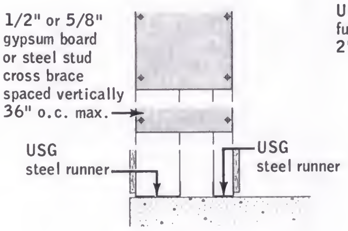
chase & furred walls


USG steel stud
3/8" USG type S-12 pan head screws
2-1/2" USG steel stud cross brace
2-1/2" USG steel runner

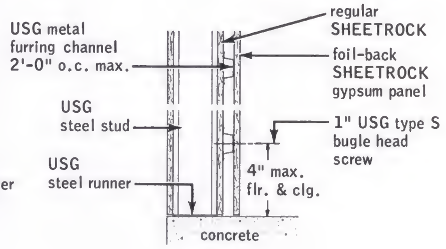
steel stud & runner brace



gypsum brace


1/2" or 5/8" gypsum board or steel stud cross brace spaced vertically 36" o.c. max.
USG steel runner
USG steel runner

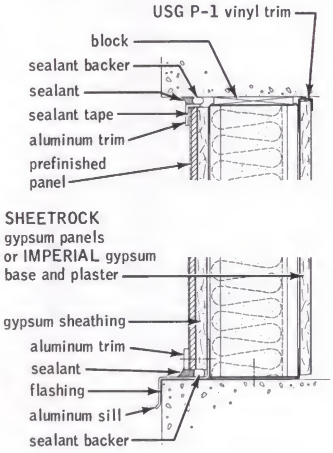
chase wall


USG metal furring channel 2'-0" o.c. max.
regular SHEETROCK
foil-back SHEETROCK gypsum panel
USG steel stud
1" USG type S bugle head screw
USG steel runner
4" max. flr. & clg.
concrete

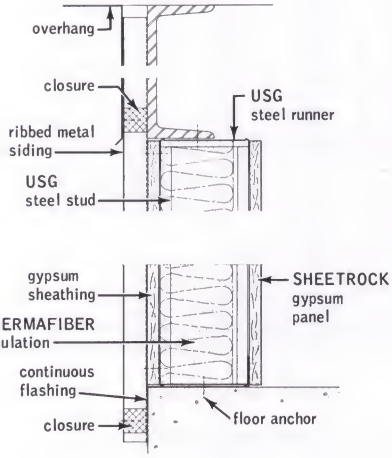
furred wall

optional exterior finishes

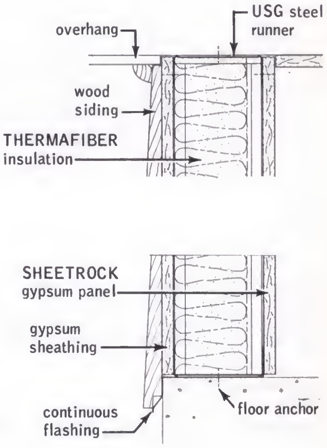
prefinished panel



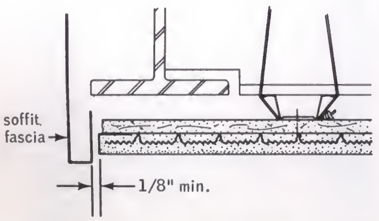
steel panel



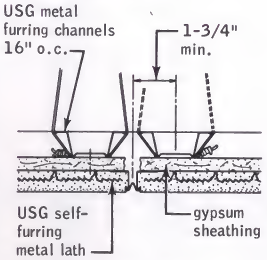
wood siding



exterior, gypsum sheathing, lath & plaster soffit

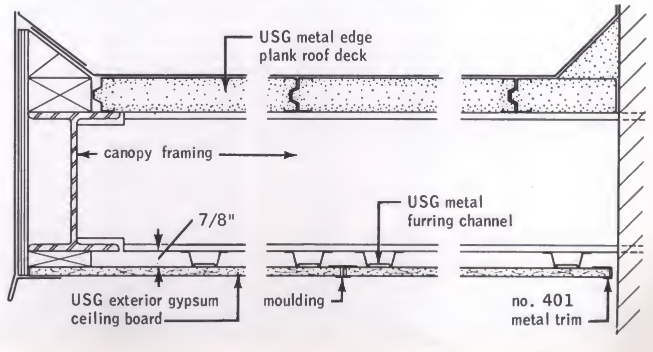


perimeter relief


USG metal furring channels 16" o.c.
1-3/4" min.
USG self-furring metal lath
gypsum sheathing

control joint

exterior gypsum ceiling board soffit


USG metal edge plank roof deck
canopy framing
USG metal furring channel
7/8"
USG exterior gypsum ceiling board
moulding
no. 401 metal trim

exterior curtain wall stud

limiting heights with interior and exterior facing — *sheathing & drywall*

design criteria		stud spacing (in o.c.)	limiting heights (1) for USG steel stud-section designations											
			3½″					5½″				7½″		
wind load	deflection limitation		35ST8	35ST10	35ST13	35ST16	35ST20	55ST10	55ST13	55ST16	55ST20	75ST13	75ST16	75ST20
15 psf (75 mph)	L/120	12	16′0″	16′9″	18′3″	19′9″	21′0″	24′0″	26′6″	28′3″	30′3″	33′3″	36′3″	38′9″
		16	14′6″	15′6″	16′9″	18′0″	19′3″	21′9″	24′3″	25′9″	27′6″	30′3″	33′0″	35′3″
		24	12′0″	13′3″	14′6″	15′9″	16′9″	17′9″	21′0″	22′6″	24′0″	25′0″	28′9″	31′0″
	L/240	12	12′9″	13′6″	14′6″	15′9″	16′9″	19′0″	21′0″	22′6″	24′0″	26′3″	28′9″	30′9″
		16	11′6″	12′3″	13′3″	14′3″	15′3″	17′3″	19′3″	20′6″	22′0″	24′0″	26′3″	28′0″
		24	10′0″	10′9″	11′6″	12′6″	13′3″	15′3″	16′9″	17′9″	19′3″	21′0″	23′0″	24′6″
	L/360	12	11′0″	11′9″	12′9″	13′9″	14′6″	16′6″	18′6″	19′6″	21′0″	23′0″	25′3″	27′0″
		16	10′0″	10′9″	11′6″	12′6″	13′3″	15′3″	16′9″	17′9″	19′3″	21′0″	23′0″	24′6″
		24	8′9″	9′3″	10′0″	11′0″	11′9″	13′3″	14′9″	15′6″	16′9″	18′3″	20′0″	21′6″
20 psf (85 mph)	L/120	12	14′6″	15′3″	16′6″	18′0″	19′3″	21′9″	24′0″	25′9″	27′6″	30′3″	33′0″	35′3″
		16	12′9″	14′0″	15′3″	16′6″	17′6″	19′0″	22′0″	23′3″	25′0″	26′6″	30′0″	32′3″
		24	10′3″	11′3″	12′9″	14′3″	15′3″	15′0″	18′0″	20′0″	22′0″	20′0″	25′0″	27′9″
	L/240	12	11′6″	12′3″	13′3″	14′3″	15′3″	17′3″	19′3″	20′3″	21′9″	24′0″	26′3″	28′0″
		16	10′6″	11′0″	12′0″	13′0″	13′9″	15′9″	17′6″	18′6″	20′0″	21′9″	23′9″	25′6″
		24	9′3″	9′9″	10′6″	11′3″	12′0″	13′9″	15′3″	16′3″	17′6″	19′0″	20′9″	22′3″
	L/360	12	10′0″	10′6″	11′6″	12′6″	13′3″	15′0″	16′9″	17′9″	19′0″	21′0″	23′0″	24′6″
		16	9′3″	9′9″	10′6″	11′3″	12′0″	13′9″	15′3″	16′3″	17′6″	19′0″	20′9″	22′3″
		24	8′0″	8′6″	9′3″	10′0″	10′6″	12′0″	13′3″	14′3″	15′3″	16′9″	18′3″	19′6″
25 psf (95 mph)	L/120	12	13′0″	14′3″	15′6″	16′9″	17′9″	19′6″	22′6″	23′9″	25′6″	27′6″	30′9″	32′9″
		16	11′3″	12′6″	14′0″	15′3″	16′3″	17′0″	19′9″	21′9″	23′3″	23′9″	27′3″	29′9″
		24	9′3″	10′3″	11′6″	13′0″	14′3″	12′0″	16′0″	17′9″	20′0″	16′0″	20′0″	24′9″
	L/240	12	10′9″	11′3″	12′3″	13′3″	14′0″	16′0″	17′9″	19′0″	20′3″	23′3″	24′3″	26′0″
		16	9′9″	10′3″	11′3″	12′0″	12′9″	14′9″	16′3″	17′3″	18′6″	20′3″	22′3″	23′9″
		24	8′6″	9′0″	9′9″	10′6″	11′3″	12′0″	14′3″	15′0″	16′3″	16′0″	19′3″	20′9″
	L/360	12	9′3″	9′9″	10′9″	11′6″	12′3″	14′0″	15′6″	16′6″	17′9″	19′6″	21′3″	22′9″
		16	8′6″	9′0″	9′9″	10′6″	11′3″	12′9″	14′3″	15′0″	16′3″	17′9″	19′3″	20′9″
		24	7′6″	8′0″	8′6″	9′3″	9′9″	11′3″	12′3″	13′3″	14′0″	15′6″	17′3″	18′0″
30 psf (105 mph)	L/120	12	12′0″	13′3″	14′6″	15′9″	16′9″	17′9″	21′0″	22′6″	24′0″	25′0″	28′9″	30′9″
		16	10′3″	11′3″	12′9″	14′3″	15′3″	15′0″	18′0″	20′0″	22′0″	20′0″	25′0″	27′9″
		24	8′3″	9′3″	10′6″	12′0″	13′3″	10′0″	13′3″	16′3″	18′3″	13′3″	16′9″	20′9″
	L/240	12	10′0″	10′6″	11′6″	12′6″	13′3″	15′0″	16′9″	17′9″	19′0″	21′0″	23′0″	24′6″
		16	9′3″	9′9″	10′6″	11′3″	12′0″	13′9″	15′3″	16′3″	17′6″	19′0″	20′9″	22′3″
		24	8′0″	8′6″	9′3″	10′0″	10′6″	10′0″	13′3″	14′3″	15′3″	13′3″	16′9″	19′6″
	L/360	12	8′9″	9′3″	10′0″	10′9″	11′6″	13′3″	14′6″	15′6″	16′9″	18′3″	20′0″	21′6″
		16	8′0″	8′6″	9′3″	10′0″	10′6″	12′0″	13′3″	14′3″	15′3″	16′9″	18′3″	19′6″
		24	7′0″	7′6″	8′0″	8′9″	9′3″	10′0″	11′9″	12′3″	13′3″	13′3″	16′0″	17′0″
35 psf (115 mph)	L/120	12	11′0″	12′3″	13′9″	15′0″	15′9″	16′6″	19′3″	21′3″	22′9″	22′9″	26′9″	29′3″
		16	9′6″	10′6″	12′0″	13′6″	14′6″	12′9″	16′9″	18′6″	20′6″	17′3″	21′6″	25′6″
		24	7′3″	8′6″	9′9″	11′0″	12′3″	8′6″	11′6″	15′0″	16′9″	11′6″	14′3″	17′9″
	L/240	12	9′6″	10′0″	11′0″	11′9″	12′6″	14′3″	16′0″	17′0″	18′3″	19′9″	21′9″	23′3″
		16	8′9″	9′3″	10′0″	10′9″	11′6″	12′9″	14′6″	15′6″	16′6″	17′3″	19′9″	21′3″
		24	7′3″	8′0″	8′9″	9′6″	10′0″	8′6″	11′6″	13′6″	14′6″	11′6″	14′3″	17′9″
	L/360	12	8′3″	8′9″	9′6″	10′3″	11′0″	12′6″	14′0″	14′9″	15′9″	17′3″	19′0″	20′3″
		16	7′9″	8′0″	8′9″	9′6″	10′0″	11′6″	12′9″	13′6″	14′6″	15′9″	17′3″	18′6″
		24	6′9″	7′0″	7′6″	8′3″	8′9″	8′6″	11′0″	11′9″	12′6″	11′6″	14′3″	16′3″
40 psf (125 mph)	L/120	12	10′3″	11′3″	12′9″	14′3″	15′3″	15′0″	18′0″	20′0″	21′9″	20′0″	25′0″	27′9″
		16	9′0″	9′9″	11′3″	12′6″	13′9″	11′3″	15′0″	17′3″	19′3″	15′0″	18′9″	23′6″
		24	6′3″	7′6″	9′0″	10′3″	11′3″	7′6″	10′0″	14′0″	15′9″	10′0″	12′6″	15′9″
	L/240	12	9′0″	9′9″	10′6″	11′3″	12′0″	13′9″	15′3″	16′3″	17′3″	19′0″	20′9″	22′3″
		16	8′3″	8′9″	9′6″	10′3″	11′0″	11′3″	13′9″	14′9″	15′9″	15′0″	18′9″	20′3″
		24	6′3″	7′6″	8′3″	9′0″	9′6″	7′6″	10′0″	12′9″	13′9″	10′0″	12′6″	15′9″
	L/360	12	8′0″	8′6″	9′0″	10′0″	10′6″	12′0″	13′3″	14′0″	15′3″	16′6″	18′3″	19′6″
		16	7′3″	7′9″	8′3″	9′0″	9′6″	11′0″	12′0″	12′9″	13′9″	15′0″	16′6″	17′9″
		24	6′3″	6′9″	7′3″	7′9″	8′6″	7′6″	10′0″	11′3″	12′0″	10′0″	12′6″	15′6″

(1) Exterior is USG Triple-Sealed Gypsum Sheathing, 0.4″ thick; interior is ½″ SHEETROCK Gypsum Panels. Stress based on capacity of studs alone. Deflection based on composite wall assembly.

limiting heights with interior and exterior facing — *stucco and drywall or plaster*

wind load (psf)	stud spacing (in o.c.)	limiting heights (1) for USG steel stud-section designations											
		3½″					5½″				7½″		
		35ST8	35ST10	35ST13	35ST16	35ST20	55ST10	55ST13	55ST16	55ST20	75ST13	75ST16	75ST20
15 (75 mph)	12	17′0″	18′6″	19′6″	20′0″	20′6″	24′6″	26′3″	27′0″	27′9″	30′9″	32′0″	33′3″
	16	14′9″	16′0″	18′3″	19′6″	19′9″	21′9″	25′3″	26′0″	26′9″	29′6″	30′9″	31′9″
	24	12′0″	13′3″	14′9″	16′9″	17′3″	17′9″	21′0″	22′9″	23′3″	25′0″	26′9″	27′9″
20 (85 mph)	12	14′9″	16′0″	17′9″	18′3″	18′6″	21′9″	23′9″	24′6″	25′3″	28′0″	29′3″	30′3″
	16	12′9″	14′0″	15′9″	17′9″	18′0″	19′0″	22′3″	23′6″	24′3″	26′6″	28′0″	28′9″
	24	10′3″	11′3″	12′9″	14′6″	15′9″	15′0″	18′0″	20′0″	21′3″	20′0″	24′3″	25′0″
25 (95 mph)	12	13′0″	14′6″	16′3″	16′9″	17′8″	19′6″	22′0″	22′9″	23′6″	26′0″	27′0″	28′0″
	16	11′3″	12′6″	14′0″	16′0″	16′9″	17′0″	19′6″	21′9″	22′6″	23′9″	26′0″	26′9″
	24	9′3″	10′3″	11′6″	13′0″	14′6″	12′0″	16′0″	17′9″	19′9″	16′0″	20′0″	23′3″
30 (105 mph)	12	12′0″	13′3″	14′9″	16′0″	16′3″	17′9″	20′9″	21′3″	22′0″	24′6″	25′6″	26′3″
	16	10′3″	11′3″	12′9″	14′6″	15′9″	15′0″	18′0″	20′0″	21′3″	20′0″	24′3″	25′0″
	24	8′3″	9′3″	10′6″	12′0″	13′3″	10′0″	13′3″	16′3″	18′3″	13′3″	16′6″	20′9″
35 (115 mph)	12	11′0″	12′3″	13′9″	15′0″	15′6″	16′6″	19′3″	20′3″	21′0″	22′9″	24′3″	25′0″
	16	9′6″	10′6″	12′0″	13′6″	13′0″	12′9″	16′9″	18′6″	20′0″	17′3″	21′3″	23′9″
	24	7′0″	8′6″	9′9″	11′0″	12′3″	8′6″	11′6″	14′3″	16′9″	11′6″	14′3″	17′9″
40 (125 mph)	12	10′3″	11′3″	12′9″	14′6″	14′9″	15′0″	18′0″	19′6″	20′0″	20′0″	23′0″	24′0″
	16	9′0″	9′9″	11′3″	12′6″	14′0″	11′3″	15′0″	17′3″	19′3″	15′0″	18′9″	22′9″
	24	6′3″	7′6″	9′0″	10′3″	11′3″	7′6″	10′0″	12′6″	15′9″	10′0″	12′6″	15′6″

(1) Limiting criterion: allowable bending stress, deflection or shear, whichever controls. Stress based on capacity of studs alone. Deflection based on composite wall assembly.

exterior curtain wall stud

limiting heights with interior and exterior facing—*masonry and drywall or plaster*

wind load (psf)	stud spacing (in o.c.)	limiting heights (1) for USG steel stud-section designations											
		3½″					5½″				7½″		
		35ST8	35ST10	35ST13	35ST16	35ST20	55ST10	55ST13	55ST16	55ST20	75ST13	75ST16	75ST20
15 (75 mph)	12	15′3″	15′9″	16′6″	17′0″	17′9″	20′3″	21′6″	22′6″	23′9″	26′3″	28′0″	29′6″
	16	14′9″	15′3″	15′9″	16′3″	16′9″	19′3″	20′6″	21′3″	22′3″	24′6″	26′3″	27′6″
	24	12′0″	13′3″	13′9″	14′3″	14′9″	16′9″	17′9″	18′6″	19′6″	21′6″	22′9″	24′0″
20 (85 mph)	12	14′0″	14′3″	15′0″	15′6″	16′0″	18′6″	19′9″	20′6″	21′6″	23′9″	25′6″	26′9″
	16	12′9″	13′9″	14′3″	14′9″	15′3″	17′6″	18′6″	19′3″	20′3″	22′3″	23′9″	25′0″
	24	10′3″	11′3″	12′6″	13′0″	13′3″	15′0″	16′3″	16′9″	17′6″	19′6″	20′9″	21′9″
25 (95 mph)	12	13′0″	13′3″	13′9″	14′6″	15′0″	17′0″	18′3″	19′0″	20′0″	22′0″	23′6″	24′9″
	16	11′3″	12′6″	13′3″	13′9″	14′3″	16′3″	17′3″	18′0″	18′9″	20′9″	22′0″	23′3″
	24	9′3″	10′3″	11′6″	12′0″	12′6″	12′0″	15′0″	15′6″	16′3″	16′0″	19′3″	20′3″
30 (105 mph)	12	12′0″	12′6″	13′0″	13′6″	14′0″	16′0″	17′3″	18′0″	18′9″	20′9″	22′3″	23′6″
	16	10′3″	11′3″	12′6″	13′0″	13′3″	15′0″	16′3″	16′9″	17′6″	19′6″	20′9″	21′9″
	24	8′3″	9′3″	10′6″	11′3″	11′9″	10′0″	13′3″	14′9″	15′6″	13′3″	16′6″	19′0
35 (115 mph)	12	11′0″	12′0″	12′3″	13′0″	13′3″	15′3″	16′3″	17′0″	17′9″	19′9″	21′0″	22′3″
	16	9′6″	10′6″	11′9″	12′3″	12′9″	12′9″	15′6″	16′0″	16′9″	17′3″	19′9″	20′9″
	24	7′0″	8′6″	9′9″	10′9″	11′0″	8′6″	11′6″	14′0″	14′6″	11′6″	14′3″	17′9″
40 (125 mph)	12	10′3″	11′3″	11′9″	12′3″	12′9″	14′6″	15′6″	16′3″	17′0″	19′0″	20′3″	21′3″
	16	9′0″	9′9″	11′3″	11′9″	12′3″	11′3″	14′9″	15′3″	16′0″	15′0″	18′9″	19′9″
	24	6′3″	7′6″	8′6″	10′3″	10′6″	7′6″	10′0″	12′6″	14′0″	10′0″	12′6″	15′6″

(1) Limiting criterion: allowable bending stress, deflection or shear, whichever controls. Stress based on capacity of studs alone. Deflection based on composite wall assembly.

limiting heights with interior and exterior facing(1)

design criteria		limiting heights for USG steel stud-section designations											
		stucco exterior						masonry exterior					
wind load (psf)	stud spacing (in o.c.)	2″	2½″	3″	3⅝″	4″	6″	2″	2½″	3″	3⅝″	4″	6″
		20ST10	212ST10	30ST10	358ST10	40ST10	60ST10	20ST10	212ST10	30ST10	358ST10	40ST10	60ST10
15 (75 mph)	12	12′0″	13′6″	15′9″	16′6″	17′6″	21′6″	10′3″	10′9″	11′6″	12′3″	13′0″	14′3″
	16	10′6″	12′3″	13′9″	15′9″	16′6″	20′3″	10′0″	10′6″	11′0″	11′9″	12′3″	13′3″
	24	8′6″	10′0″	11′3″	12′9″	13′9″	17′0″	8′6″	9′3″	9′9″	10′3″	10′9″	11′6″
20 (85 mph)	12	10′6″	12′3″	13′9″	15′0″	16′0″	19′6″	10′3″	10′9″	11′6″	12′3″	13′0″	14′3″
	16	9′0″	10′9″	11′9″	13′6″	14′6″	18′0″	9′0″	10′6″	11′0″	11′9″	12′3″	13′3″
	24	7′6″	8′9″	9′9″	11′0″	11′9″	14′9″	7′6″	8′6″	9′9″	10′3″	10′9″	11′6″
25 (95 mph)	12	9′3″	11′0″	12′3″	14′0″	14′9″	18′0″	9′3″	10′9″	11′6″	12′3″	13′0″	14′3″
	16	8′0″	9′6″	10′6″	12′3″	13′0″	16′0″	8′0″	9′3″	10′6″	11′9″	12′3″	13′3″
	24	6′6″	7′9″	8′6″	10′0″	10′6″	12′0″	6′6″	7′9″	8′6″	9′9″	10′6″	11′6″
30 (105 mph)	12	8′6″	10′0″	11′3″	12′9″	13′9″	17′0″	8′6″	9′9″	11′3″	12′3″	13′0″	14′0″
	16	7′6″	8′9″	9′9″	11′0″	11′9″	14′9″	7′6″	8′6″	9′9″	11′0″	11′9″	13′3″
	24	6′0″	7′0″	7′9″	9′0″	9′9″	10′0″	6′0″	7′0″	7′9″	9′0″	9′6″	10′0″
35 (115 mph)	12	8′0″	9′3″	10′3″	11′9″	12′9″	15′9″	8′0″	9′3″	10′3″	11′9″	12′6″	14′0″
	16	6′9″	8′0″	9′0″	10′3″	11′0″	12′9″	6′9″	8′0″	9′0″	10′0″	10′9″	12′3″
	24	5′6″	6′6″	7′3″	8′6″	8′6″	8′6″	5′6″	6′6″	7′3″	8′3″	8′6″	8′6″
40 (125 mph)	12	7′6″	8′9″	9′9″	11′0″	11′9″	14′9″	7′6″	8′6″	9′9″	11′0″	11′9″	13′3″
	16	6′6″	7′6″	8′3″	9′6″	10′3″	11′3″	6′6″	7′6″	8′3″	9′6″	10′0″	11′3″
	24	5′3″	6′3″	6′9″	7′6″	7′6″	7′6″	5′3″	6′0″	6′9″	7′6″	7′6″	7′6″

(1) Drywall, plaster and chase wall interior, stucco or masonry exterior. Stress based on capacity of studs alone. Deflection based on composite wall assembly.

exterior curtain wall framing C-H Studs

limiting heights with interior and exterior facing(1)

design criteria		stud spacing (in o.c.)	limiting heights for USG steel stud-section designations	
wind load	defl. limit.		2½″ CH8	4″ CH10
15 psf (75 mph)	L/120	12	14′9″(d)	19′3″(d)
		16	12′9″(f)	17′9″(d)
		24	10′6″(f)	15′9″(d)
	L/240	12	11′9″(d)	15′3″(d)
		16	11′0″(d)	14′0″(d)
		24	10′3″(d)	12′6″(d)
	L/360	12	10′3″(d)	13′6″(d)
		16	9′9″(d)	12′3″(d)
		24	9′0″(d)	11′0″(d)
20 psf (85 mph)	L/120	12	12′9″(f)	17′6″(d)
		16	11′0″(f)	16′0″(d)
		24	9′0″(f)	14′0″(v)
	L/240	12	10′6″(d)	14′0″(d)
		16	10′0″(d)	12′9″(d)
		24	9′0″(f)	11′6″(d)
	L/360	12	9′3″(d)	12′3″(d)
		16	8′9″(d)	11′3″(d)
		24	8′3″(d)	10′0″(d)
25 psf (95 mph)	L/120	12	11′6″(f)	16′3″(d)
		16	10′0″(f)	15′0″(d)
		24	8′0″(f)	11′3″(d)
	L/240	12	9′9″(d)	13′0″(d)
		16	9′3″(d)	12′0″(d)
		24	8′0″(f)	10′6″(d)
	L/360	12	8′6″(d)	11′3″(d)
		16	8′3″(d)	10′6″(d)
		24	—	9′3″(d)
30 psf (105 mph)	L/120	12	10′6″(f)	15′3″(d)
		16	9′0″(f)	14′0″(d)
		24	—	9′6″(v)
	L/240	12	9′3″(d)	12′3″(d)
		16	8′9″(d)	11′3″(d)
		24	—	9′6″(v)
	L/360	12	8′0″(d)	10′6″(d)
		16	—	9′9″(d)
		24	—	8′9″(d)
35 psf (115 mph)	L/120	12	9′9″(f)	14′6″(d)
		16	8′6″(f)	12′0″(v)
		24	—	8′0″(v)
	L/240	12	8′9″(d)	11′6″(d)
		16	8′3″(d)	10′6″(d)
		24	—	8′0″(v)
	L/360	12	—	10′0″(d)
		16	—	9′0″(d)
		24	—	8′0″(v)
40 psf (125 mph)	L/120	12	9′0″(f)	14′0″(d)
		16	—	10′6″(v)
		24	—	—
	L/240	12	8′6″(d)	11′0″(d)
		16	—	10′6″(v)
		24	—	—
	L/360	12	—	9′9″(d)
		16	—	8′9″(d)
		24	—	—

Limiting criteria: (f) bending stress; (d) deflection; (v) end reaction. (1) Any independently supported exterior treatment; interior is two layers of ½″ SHEETROCK Gypsum Panels. Stress based on capacity of studs alone. Deflection based on composite wall assembly.

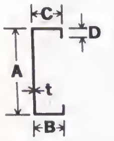
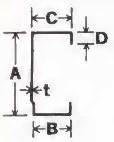
technical data

thermal properties

wall type	stud sizes	insulation thickness (in.)	thermal transmittance (1) R	thermal transmittance (1) U
Stucco Exterior—Plaster or Drywall Interior	2″, 2½″, 3½″, 3⅝″, 4″, 5½″, 6″, 7½″	0	4.41	.23
	3½″, 3⅝″, 4″, 5½″, 6″, 7½″	3	15.55	.06
	4, 5½″, 6″, 7½″	3⅝	17.81	.06
Masonry Exterior—Plaster or Drywall Interior	2″, 2½″, 3½″, 3⅝″, 4″, 5½″, 6″, 7½″	0	5.62	.18
	3½″, 3⅝″, 4″, 5½″, 6″, 7½″	3	16.76	.06
	4″, 5½″, 6″, 7½″	3⅝	19.02	.05

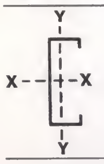
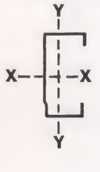
(1) Values based on actual air space thickness.

physical properties

stud system		dimension A	dimension B	dimension C	dimension D	metal thickness t(1)	net area sq. in.(2)	avg. wt. lb. per MLF(3)
	20ST10	2″	1.250	1.406	0.438	0.0354	0.187	643
	212ST10	2½″	1.250	1.406	0.438	0.0354	0.205	704
	30ST10	3″	1.250	1.406	0.438	0.0354	0.223	767
	358ST10	3⅝″	1.250	1.406	0.438	0.0354	0.245	844
	40ST10	4″	1.250	1.406	0.438	0.0354	0.259	891
	60ST10	6″	1.250	1.406	0.438	0.0354	0.331	1,140
	35ST8	3.448	1.606	1.724	0.500	0.0294	0.217	799
	35ST10	3.448	1.606	1.724	0.500	0.0354	0.262	948
	35ST13	3.448	1.606	1.724	0.500	0.0459	0.338	1,218
	35ST16	3.421	1.552	1.724	0.625	0.0608	0.453	1,600
	35ST20	3.421	1.552	1.724	0.625	0.0757	0.558	1,969
	55ST8	5.448	1.606	1.724	0.500	0.0294	0.278	1,013
	55ST10	5.448	1.606	1.724	0.500	0.0354	0.335	1,202
	55ST13	5.448	1.606	1.724	0.500	0.0459	0.461	1,551
	55ST16	5.421	1.552	1.724	0.625	0.0608	0.587	2,108
	55ST20	5.421	1.552	1.724	0.625	0.0757	0.725	2,504
	75ST8	7.448	1.606	1.724	0.500	0.0294	0.334	1,226
	75ST10	7.448	1.606	1.724	0.500	0.0354	0.404	1,457
	75ST13	7.448	1.606	1.724	0.500	0.0459	0.524	1,880
	75ST16	7.421	1.552	1.724	0.625	0.0608	0.707	2,447
	75ST20	7.421	1.552	1.724	0.625	0.0757	0.875	3,039

(1) Min. thickness including G-60 (.001″) galvanized coating. (2) Excluding galvanized coating. (3) Average shipping weight.

structural properties

stud system	stud (1)	Ix in⁴	Sx in³	Rx in	Iy in⁴	Sy in³	Ry in
	20ST10	0.126	0.123	0.820	0.048	0.054	0.510
	212ST10	0.210	0.164	1.012	0.052	0.055	0.507
	30ST10	0.320	0.209	1.197	0.055	0.056	0.501
	358ST10	0.497	0.269	1.422	0.056	0.056	0.493
	40ST10	0.626	0.307	1.553	0.057	0.057	0.487
	60ST10	0.864	0.396	2.076	0.060	0.057	0.463
	35ST8	0.422	0.242	1.395	0.085	0.075	0.627
	35ST10	0.506	0.291	1.391	0.101	0.088	0.620
	35ST13	0.649	0.372	1.385	0.125	0.110	0.609
	35ST16	0.835	0.478	1.358	0.167	0.151	0.606
	35ST20	1.017	0.582	1.349	0.195	0.176	0.591
	55ST8	1.222	0.445	2.098	0.100	0.079	0.601
	55ST10	1.469	0.535	2.094	0.119	0.094	0.595
	55ST13	2.032	0.738	2.097	0.156	0.127	0.607
	55ST16	2.478	0.898	2.079	0.207	0.164	0.607
	55ST20	3.039	1.101	2.070	0.254	0.201	0.599
	75ST8	2.570	0.686	2.772	0.110	0.082	0.573
	75ST10	3.092	0.825	2.767	0.130	0.097	0.567
	75ST13	3.986	1.063	2.758	0.162	0.121	0.557
	75ST16	5.267	1.401	2.730	0.220	0.168	0.558
	75ST20	6.467	1.720	2.718	0.260	0.198	0.545

(1) Maximum allowable flexural stress: 20,000 psi.

specifications

notes to architect

1. *These specifications are for exterior non-load bearing curtain wall systems using USG Light Steel Studs and securely attached interior and exterior facings. Expand or alter as necessary for project specifications.*

2. *Maximum allowable wall heights, stud spacings, and runner attachment spacings are shown in Technical Data, pages 8 and 9. Select values and insert in the specifications. Brick veneer must be structurally supported at every floor.*

3. **Shadowing and Spotting**—*During periods of low outside temperature, condensation may form on outside walls, collecting airborne dirt to produce shadowing and spotting over fasteners and furring. This is a natural phenomenon which occurs through no fault in the products.*

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternates should be considered:

   a. *The interior facing of Foil-Back SHEETROCK Panels should be furred from the studs using a base layer of panels screw-attached to the studs and horizontally applied USG Metal Furring Channels spaced 24″ o.c. (see details, page 7).*

   b. *For maximum resistance to shadowing and spotting, a separate chase wall construction is recommended using studs that are independent of the exterior studs and membrane (see details, page 7).*

4. **Expansion and Contraction**—*Curtain wall surfaces should be isolated with control joints or other means where:* **(a)** *curtain wall abuts a structural element (except floor) or dissimilar wall or ceiling;* **(b)** *construction changes within the plane of the wall;* **(c)** *stucco surfaces exceed 10′ in either direction;* **(d)** *the area within stucco sections exceeds 100 sq. ft.;* **(e)** *the basic construction contains a control joint;* **(f)** *interior partition run exceeds 30′. Ceiling-height door and window frames may be used as control joints, as may less-than-ceiling height frames if control joints extend to the ceiling and floor from both corners.*

Sheathing should be broken behind control joints. Where vertical and horizontal joints intersect, the horizontal joint should be continuous and the vertical joint should abut it. Splices, terminals and intersections should be caulked with a sealant.

5. **Air and Water Infiltration**—*Flashing and sealants as shown in the details should be provided to resist air and water infiltration. All openings at abutting sheathing must be sealed to prevent direct passage of water. Accessories for stucco finishes should be made of zinc alloy with weep holes 12″ o.c. In high-wind areas where moisture may penetrate porous stucco and masonry exteriors, an additional weather-resistive barrier such as 15-lb. felt building paper applied over the gypsum sheathing may be required.*

6. **Corrosive Materials**—*USG Metal Lath, Control Joints and other USG Metal Accessories should not be used with magnesium oxychloride cement stuccos or stuccos containing calcium chloride additives. Zinc-alloy accessories are available from U.S.G. for use in specific applications.*

7. **Prefinished Panels**—*Ceramic, aggregated or porcelain-enameled panels, metal siding and other dry exterior facings weighing up to 8 psf may be applied over gypsum sheathing and screw-attached to studs. Use stainless steel or cadmium-plated screws, spaced according to siding manufacturer's recommendations. Screws should not transfer more than 15 lbs. panel weight per screw to studs. Screw lengths are based on panel thickness plus ⅞″.*

8. *See U.S.G. product folders in this series: Gypsum Panels & Accessories Folder SA-927 for information on system components; Paint Products Folder SA-933 for paint specifications; Gypsum Plasters, Bases & Accessories Folder SA-917 for plaster system components and specifications; Fire Safety Systems Folder SA-707 for data on insulation and mineral fireproofing.*

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during the period of gypsum panel and joint finishing or lath and plaster application, temperatures within the building shall be maintained uniformly within the range of 55°F. Adequate ventilation shall be provided to eliminate excessive moisture within the building during this period.

1.5 certificates of compliance

Prior to shipping any exterior curtain wall material to the site, the Contractor shall submit to the Architect copies of manufacturer's certificates showing compliance with the air and water infiltration standards set by NAAMM at the specified wind velocity. All certificates shall be issued by an independent testing laboratory.

Part 2: products

2.1 materials manufactured by United States Gypsum

a. **Studs and Runners—**
   1. USG Light Steel Studs and Runners—Nos. 20ST10 (2″), 212ST10 (2½″), 30ST10 (3″), 358ST10 (3⅝″), 40ST10 (4″), 60ST10 (6″), 35ST8 (3½″), 35ST10 (3½″), 35ST13 (3½″), 35ST16 (3½″), 35ST20 (3½″), 55ST8 (5½″), 55ST10 (5½″), 55ST13 (5½″), 55ST16 (5½″), 55ST20 (5½″), 75ST8 (7½″), 75ST10 (7½″), 75ST13 (7½″), 75ST16 (7½″), 75ST20 (7½″); and Runner Nos. 35CR8 (3½″), 35CR10 (3½″), 35CR13 (3½″), 55CR8 (5½″), 55CR10 (5½″), 55CR13 (5½″), 55CR16 (5½″), 55CR20 (5½″), 75CR8 (7½″), 75CR10 (7½″), 75CR13 (7½″), 75CR16 (7½″), 75CR20 (7½″).
   2. USG Steel C-H Studs and J-Runners—Nos. 212CH8 (2½″), 400CH10 (4″); and Runner Nos. 212JR7 (2½″), 400JR7 (4″).
   3. Standard USG Steel Studs and Runners—Nos. 158ST5 (1⅝″), 212ST5 (2½″), 358ST5 (3⅝″), *for interior chase wall.*
   4. USG Metal Furring Channel, *for furred interior wall.*

b. **Sheathing**—USG Gypsum Sheathing—½″ thick, (2′, 4′x8′); USG Triple-Sealed Gypsum Sheathing—.40″ thick, (4′x8′), (4′x9′); USG Gypsum Liner Panels—1″ thick, 2′x lengths to 16′, *(for use with C-H Stud Infill Panel System).*

c. **Insulation—**
   1. Thermafiber Metal Stud Insulating Blankets—(3″) (3⅝″) thick, (16″) (24″) wide x (48″) (96″) long or Contractor CW-40 Thermafiber Insulation (1″), (1½″), (2″) thick, (16″) (24″) wide x 60″ long.
   2. Thermafiber Sound Attenuation Blankets—(1½″) (2″) thick, x (16″x48″) (24″x48″). *(Use where noncombustibility is required. Specify foil-back interior gypsum panels or lath as vapor barrier.)*
   3. Thermafiber Safing Insulation—(2″), (4″), thick 24″ wide, ( ) long, 4 pcf min. density, (with foil facing) (with galvanized steel impaling clips) (with fire-resistant adhesive).

d. **Gypsum Panels—**
   1. Face Boards—Foil-Back Sheetrock (Firecode) Gypsum Panels (½″) (⅝″) thick, 48″ wide, lengths as required.
   2. Backing Boards—Regular Sheetrock Gypsum Panels (½″) (⅝″) thick, 48″ wide, lengths as required *(for furred wall construction).*

e. **Gypsum Base—**
   1. Foil-Back Rocklath Plaster Base *(for standard plasters)* ⅜″ thick, (16″ x 48″) (16″ x lengths as required).
   2. Foil-Back Imperial Gypsum Base *(for veneer plasters)* ½″ thick in Regular and Firecode "C"; ⅝″ in Regular, Firecode, and Firecode "C".

f. **Plasters for Interior Surfaces**
   1. Standard Plasters and Finishes—
      a. Red Top Gypsum Plaster (100:2).
      b. Red Top Wood Fiber Plaster (100:1).
      c. Structo-Base Gypsum Plaster (100:2).
      d. Structo-Gauge Gauging Plaster and Ivory Lime (1:1 or 1:2).
      e. Red Top Keenes Cement and Ivory Lime (4:1 or 2:1).
   2. Veneer Plasters and Finishes—
      a. Imperial Finish Plaster *(single-coat system).*
      b. Imperial Basecoat Plaster *(two-coat system; specify finish plaster from d or e above or c below).*
      c. Diamond Interior Finish *(single-coat system or two-coat system over* Imperial *Basecoat Plaster).*

g. **Metal Lath**—3.4-lb. USG Galvanized (Self-Furring) (Poly-Backed) Junior Diamond Mesh Lath 27″ x 96″.

h. **USG Brand Screws and Clips—**
   1. (1″) (1¼″) (1⅝″) Type S-12, Bugle Head.
   2. ⅜″ Type S-12, Pan Head, or ½″ Type S-12 Low-Profile Head.
   3. 1″ Type S, Bugle Head, *for standard USG steel components.*

i. **Lathing Accessories**—*(specify from Gypsum Plasters, Bases & Accessories folder SA-917; specify 1″ grounds; 1″ casing beads not available from U.S.G.).*

j. **Exterior Stucco Finish**—Oriental Exterior Stucco.

k. **Stucco Lime**—Bondcrete Air-Entraining Lime.

l. **Drywall Accessories**—*(specify from U.S.G. Folder SA-927).*

m. **Joint Treatment**—*(specify from U.S.G. Folder SA-927).*

2.2 materials by other manufacturers

a. **Portland Cement-Lime Stucco**—Mixed in accordance with ANSI A42.2, Type L. Proportions: scratch coat—1 bag cement: ¾ to 1 bag Bondcrete Lime: 5 to 6 cu. ft. sand; brown coat—1 bag cement: 1 bag lime: 6 to 7 cu. ft. sand; finish coat—1 bag cement: 2 bags lime: 7 to 10 cu. ft. sand.

b. **Marblecrete Materials**—(specified by architect) meeting requirements of local contractors' association and jurisdictional authorities (stucco applied to a full 1″ thickness).

c. **Masonry Materials—**
   1. Brick, face or common; or other masonry units, and mortar materials (specified by architect).
   2. Brick anchors—corrugated 16-ga. hot-dipped galvanized G-90 sheet steel with sufficient cross-section to withstand 220 lbs. without exceeding yield point or breaking mortar bond, or as recommended by the Brick Institute of America.

d. **Runner Fasteners**—power-driven type with ability to withstand 193 lbs. single shear and 200 lbs. bearing force when driven into structural head or base and without exceeding allowable stress in runner, fastener or structural support.

e. **Polyethylene Film**—8 mil thick, clear.

Part 3: execution

3.1 erection

3.1.1 studs and runners

a. Align runner track accurately according to exterior wall layout and secure to base and head with power-driven fastener spaced 24″ o.c.

b. Position steel studs vertically in runners and space no greater than (12″) (16″) (24″) *(choose spacing from Technical Data tables)*. Securely anchor each stud to runners with four ⅜″ Type S-12 Pan Head or ½″ Type S-12 Low-Profile Head Screws, two at top and two at bottom, with one screw in each flange.

c. For chase wall, align additional interior runners accurately at floor and ceiling and securely anchor with suitable fasteners spaced not more than 24″ o.c. Position studs vertically in runners, spaced no greater than (12″) (16″) (24″) o.c. and located no more than 2″ from all door and window jambs abutting partitions, partition corners and other construction. Anchor all studs located adjacent to door and window frames, partition intersections and corners to runner flanges by positive screw engagement through stud and runner flanges.

3.1.2 exterior sheathing

Apply USG Gypsum Sheathing or Triple-Sealed Gypsum Sheathing horizontally and screw-attach to exterior of each stud with 1″ Type S-12 Screws spaced ⅜″ from ends and edges and approx. 8″ o.c. When stucco exterior will be applied, sheathing may be tacked in place, since later application of self-furring metal lath will complete sheathing anchorage. All sheathing tacked in this manner must be covered with metal lath immediately.

3.1.3 exterior metal lath and accessories

a. Apply metal lath with long dimension across supports, with ends lapped 1″ and staggered in adjacent courses, sides lapped ½″. Screw-attach self-furring metal lath through sheathing to steel studs and runners with 1¼″ Type S-12 Screws 8″ o.c.

b. Install USG Control Joint No. 100 where indicated on the drawings. Back control joints with 9″ wide, No. 15 asphalt felt strips stapled to the sheathing. Install joints with flanges under self-furring lath and attach with Bostitch 9⁄16″ "G" staples or equal, spaced 6″ apart on each flange. Break supporting members and sheathing behind control joints. Apply sealant at all splices, intersections and terminals.

c. Apply other lathing accessories per U.S.G. Folder SA-917.

3.1.4 C-H studs and runners

a. Position J-Runners at floor and ceiling with short leg toward inside of wall and secure with power-driven fasteners spaced 16″ o.c.

b. Cut Infill Panels 1″ less than floor-to-ceiling height. Drive two 8d Duplex nails into bottom of panel, 4″ from each edge. Install first panel, position C-H Stud on free end of panel, then continue alternate panel and stud application to complete wall. For installation instructions, see U.S.G Curtain Wall Design Manual CS-25.

3.1.5 masonry materials

a. Erect per architect's specifications and details.

b. Anchor brick with masonry anchors screw-attached to each metal stud. Anchor other masonry units to each stud in a similar manner, 16″ o.c. max. or as recommended by the Brick Institute of America.

3.1.6 other dry exterior facings

Follow manufacturer's recommendations for application.

3.1.7 insulation

Insert Thermafiber Metal Stud Blankets between studs and staple to gypsum sheathing using 9⁄16″ staples with divergent points placed at each corner and in the center of each blanket, or friction-fit Contractor CW-40 Thermafiber Insulation between steel studs. Install Thermafiber Safing Insulation of proper size on (impaling clips) (support brackets) spaced as needed, 24″ o.c. max., in safe-off area between curtain walls and floor slabs, leaving no voids.

3.1.8 drywall interior

a. Position Foil-Back Sheetrock (Firecode) Gypsum Panels vertically or horizontally and attach to studs with 1″ Type S-12 Screws spaced 8″ o.c.

b. For furred interior construction, apply regular Sheetrock Gypsum Panels vertically or horizontally and attach to studs with 1″ Type S-12 Screws 8″ o.c. Over the first panel layer, apply USG Metal Furring Channels horizontally 24″ o.c. and screw-attach through panels into metal studs. Attach each channel attachment flange to each stud with 1″ Type S-12 Screws. Screw-attach a second layer of foil-back panels to furring channels with 1″ Type S Screws spaced 12″ o.c.

c. For chase wall interior construction, space gypsum panel or steel stud cross braces not to exceed 48″ o.c. vertically. Screw-attach gypsum braces to stud webs with three Type S-12 Screws or screw-attach steel stud and runner braces with ⅜″ Type S-12 Screws. Apply Foil-Back Sheetrock Gypsum Panels to interior stud row with 1″ Type S Screws spaced 12″ o.c.

d. Install drywall accessories, finish joints, accessories and screw heads per U.S.G. Folder SA-927.

3.1.9 standard lath and plaster interior

a. Apply Foil-Back Rocklath Plaster Base face out with long dimension across studs. Butt ends together over studs with joints staggered in successive courses. Attach lath to each steel stud with 1″ Type S-12 Screws spaced 8″ o.c. and at least ⅜″ from ends and edges.

b. Install lathing accessories and apply gypsum sand basecoat and finish plaster per U.S.G. Folder SA-917.

3.1.10 veneer plaster interior

a. Apply Foil-Back Imperial Base vertically or horizontally and attach to studs with 1″ Type S-12 Screws 8″ o.c.

b. Install lathing accessories and apply Imperial Plaster per U.S.G. Folder SA-917.

Preassembly of exterior curtain wall sections at jobsite saves time and money. Sections slip firmly and easily into place.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, THERMAFIBER, FIRECODE, SHEETROCK, IMPERIAL, ROCKLATH, RED TOP, PERF-A-TAPE, STRUCTO-BASE, STRUCTO-GAUGE, IVORY, ORIENTAL, DIAMOND, BONDCRETE.

Note: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM 101 South Wacker Drive, Chicago, Illinois 60606
BUILDING AMERICA

SA-805/USG/Rev. 1-77 Printed in U.S.A.

KINKEAD

8.11/Ki

float-away®
Closet Systems

KINKEAD INDUSTRIES
1975—1

8 P

SPECIAL DOORS
bi-fold doors

A Subsidiary of **United States Gypsum Company**

float-away Closet Systems
all-steel bi-fold doors and shelves

Only with float-away...
all these beauty and reliability features!

You can count the reasons for the popularity of this outstanding selection of all-steel closet systems. Smooth-gliding FLOAT-AWAY Closet Doors combine with color-matched side trim and adjustable shelves for clean decorative lines, complete reliability, low installed cost and minimum maintenance.

DISTINCTION BY DESIGN: Richly-sculptured FLOAT-AWAY Doors are deepformed for the look of expensive custom millwork. Adjustable, they allow for out-of-square construction and a ¾″ normal rug clearance. Luxurious panel designs ranging from classic to contemporary harmonize with room decor, provide elegant styling. The impressive depth of louvers and relief designs sets new standards of excellence and quality. Choice of standard or ceiling-high doors provides construction and decor options.

DURABILITY WHERE IT COUNTS: For eye-appeal and lasting protection, every FLOAT-AWAY Door is thoroughly bonderized, then completely plated—actually *electro-deposited*—with finest-quality enamel. Hard baking for 22 minutes (not 2 to 5) gives a beautiful, low-sheen Bone White coating that's exceptionally mar-resistant. Won't chip or crack even if the metal is hit sharply. All-over coating assures rust resistance even in hidden areas. Smooth matte finish is free from highlights or runs. Gleaming brass door pulls add deluxe quality touch. Pulls also available in antique bronze and satin aluminum.

LIFETIME CONSTRUCTION: For extra value, FLOAT-AWAY Bi-fold Doors and Shelves are fabricated from heavy 24-gauge cold-rolled enameled steel. High-strength, all-welded construction on doors assures trouble-free operation.

NOISELESS GLIDE: Superior engineering plus sound-dampening hardware give the finest in smooth, floating action. Doors glide open and closed quietly, effortlessly. Nylon-to-metal contacts plus sound-deadening material in back panel help eliminate noise. Sturdy hinges join panels for silent, smooth operation.

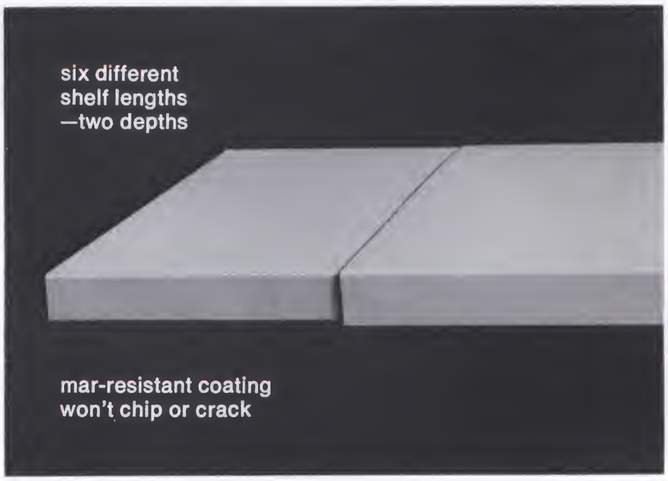
TWIN TRACKS: Identical top and bottom FLOAT-A-MATIC Guide Tracks can't cause confusion in installation. Made of rugged extruded aluminum, they won't deform if stepped on, provide permanently true tracks for free-floating action. What's more, the optional FLOAT-A-LEVEL top track compensates for irregularities in floors and ceilings. Bottom track allows door to open and close more rigidly—no shake, chatter, grab or twist like wooden or plastic doors. Nylon-tipped steel threaded guide pins assure extra quietness. Doors are full 1⅛″ thick for superior sturdiness and quality appearance.

VERSATILE JAMB TRIM: Attractive jamb trim finishes opening for perfect installation without unsightly gaps at jambs. Choice of six widths—from 1″ through 3½″ in ½″ increments—allows use of a standard door even if opening is oversize.

Here's PROOF of Value

- Quick installation
- Low cost (up to 50% less than wood)
- Decorator beauty
- Prefinished—complements every decor
- Adjustable height and width within opening
- Non-warping, no skin delamination, rust-resisting
- Quiet, effortless glide
- Permanent finish cleans easily—never needs paint

Matching Adjustable Shelves complete your closet system


six different shelf lengths —two depths
mar-resistant coating won't chip or crack

Sturdy steel shelves with mar-resistant enamel finish complement your FLOAT-AWAY Doors. See back cover.

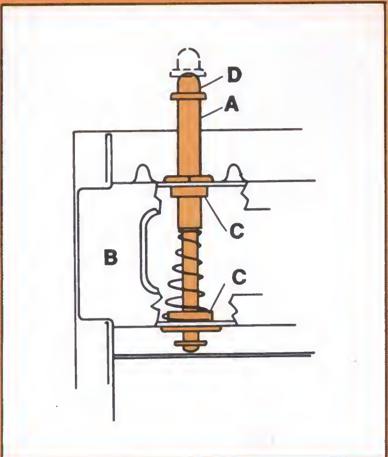
Appealing Styles for All Interiors

Select the door of your choice from the following pages. Wide range of styling assures a perfect match for your decor—and each door features FLOAT-AWAY reliability.

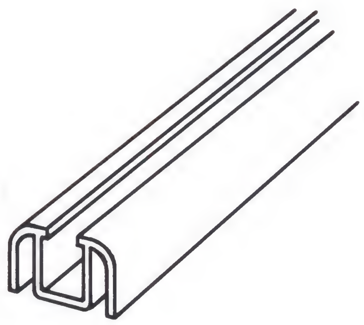
Copyright 1975, United States Gypsum Company

Construction features of **float-away** Closet Doors

(A) Spring-loaded top pivot pins require no adjustment or tightening. (B) Stiffener braces at top and bottom have unique design that holds panels flush, reinforcing top and bottom edges against damage. (C) Nylon bushings in pivot and guide pin holes prevent wear, eliminate noise. (D) Nylon tips on guide pins assure smooth, silent operation.

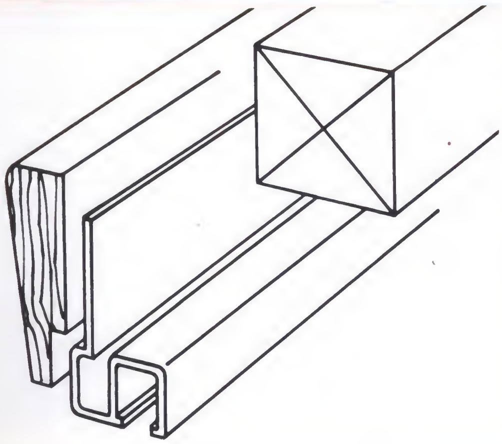


Versatile **float-a-matic** Tracks... meet all types of construction needs

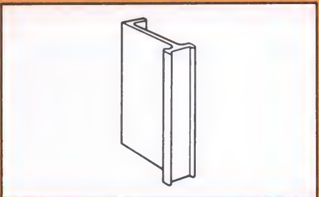

1.

Extruded aluminum thresholds and top track with pivot bearings provide extra adjustment to meet any installation conditions.

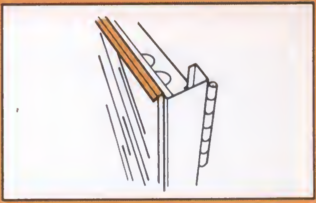
float-a-level Track


2.

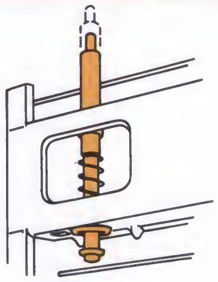
FLOAT-A-LEVEL Top Track of extruded aluminum solves problem of uneven floors and ceilings associated with poured concrete construction common to high-rise apartments and offices.



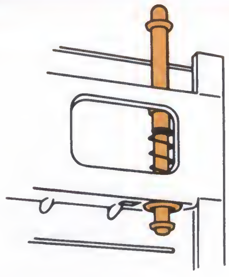
Full mirror door handle features straight-line styling with full-finger grip for easy opening/closing. Choice of satin aluminum (standard) or satin gold finish.



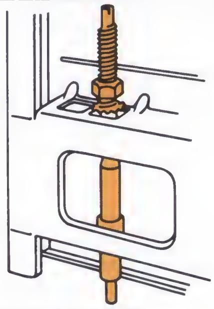
Perfect-image glass with attractive pencil edges attaches securely with *double* mounting system: strong shock-absorbing tape and full width, top-and-bottom metal retainers.



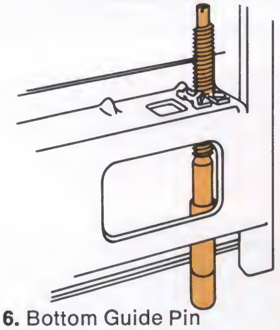
3. Top Pivot Pin (spring-loaded)



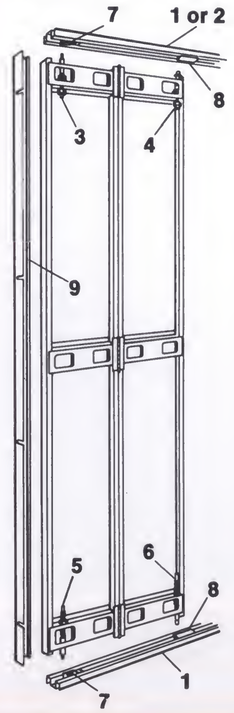
4. Top Guide Pin (spring-loaded)

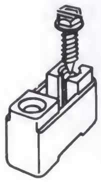


5. Bottom Pivot Pin with Lock Nut (threaded)

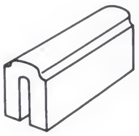


6. Bottom Guide Pin (threaded)

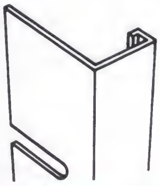




7. Pivot Bearing

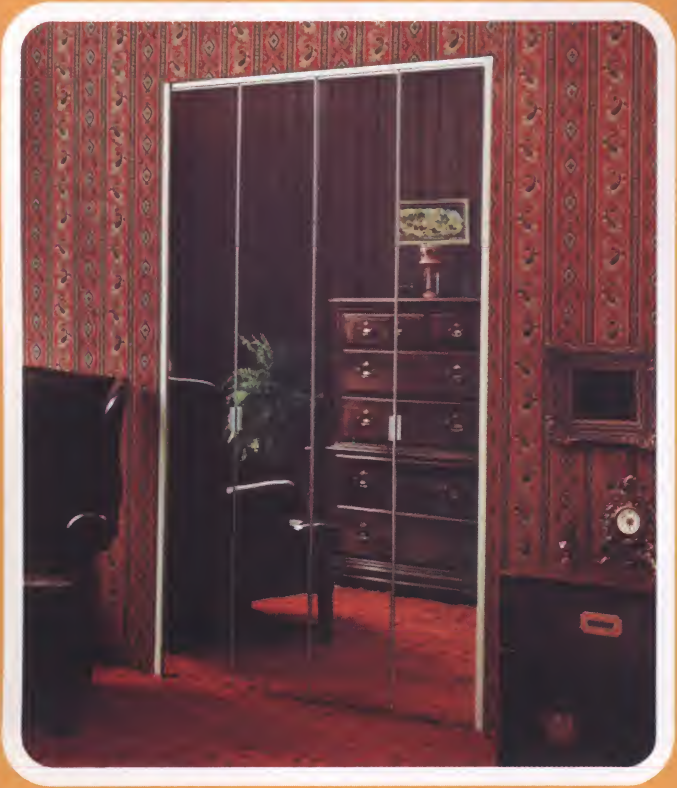


8. Tension Block

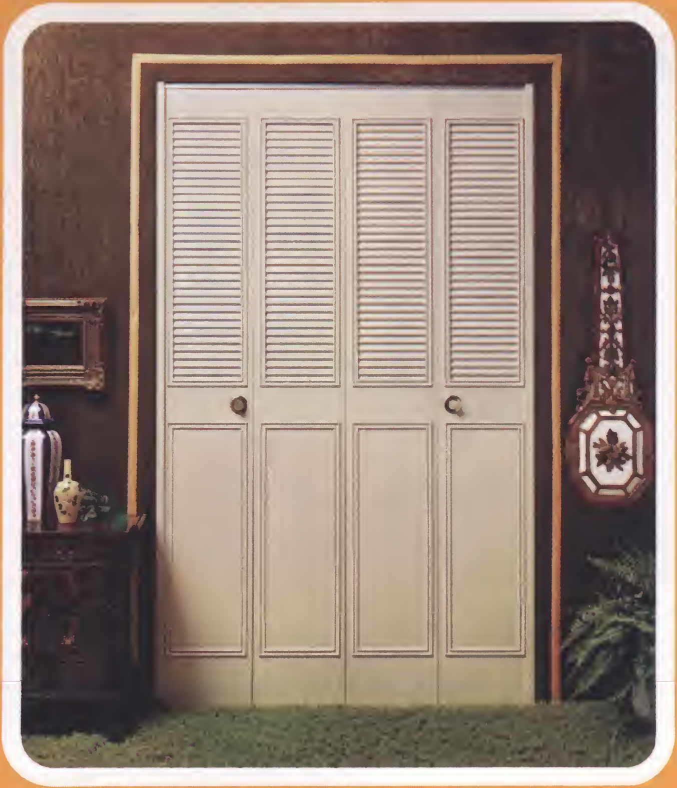


9. Jamb Trim (optional)

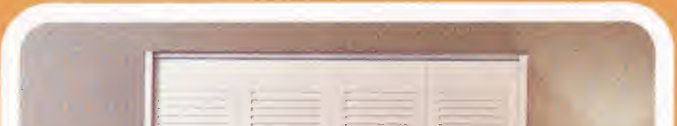
7 handsome door designs—authentic and distinctive



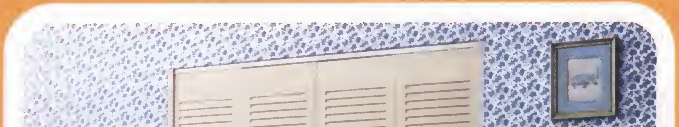
Full Mirror . . . full-height mirrors create richly reflective vista of silvery beauty, while adding visual spaciousness and imposing depth to room. Perfect way to double apparent room size with elegance and exceptional charm.



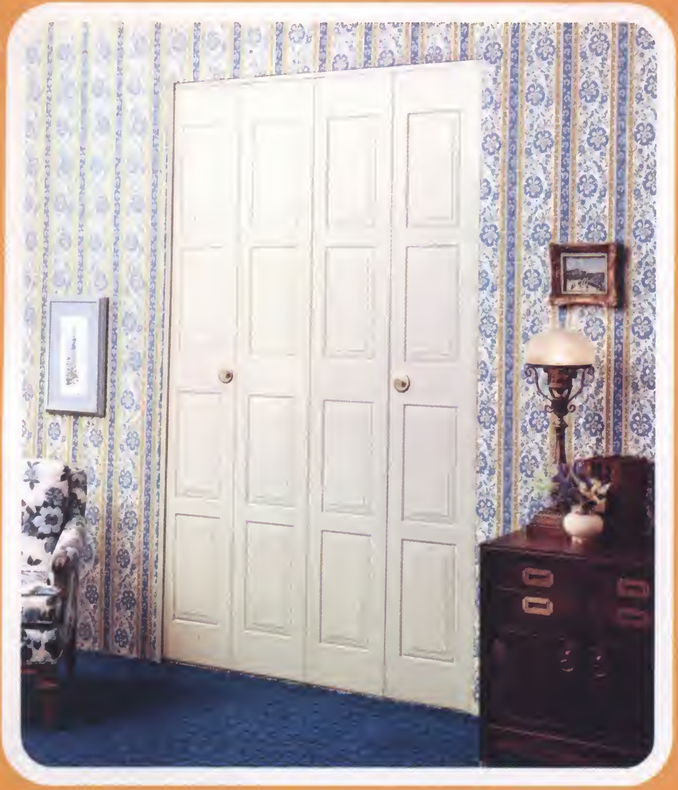
Savoy . . . traditional charm plus authentic handcrafted look with impressive relief accentuating depth of design. Air-flow louvers create patterned effect, while classic lower panels offer subtle contrast. Attractive moulding outlines door in picture frame setting.



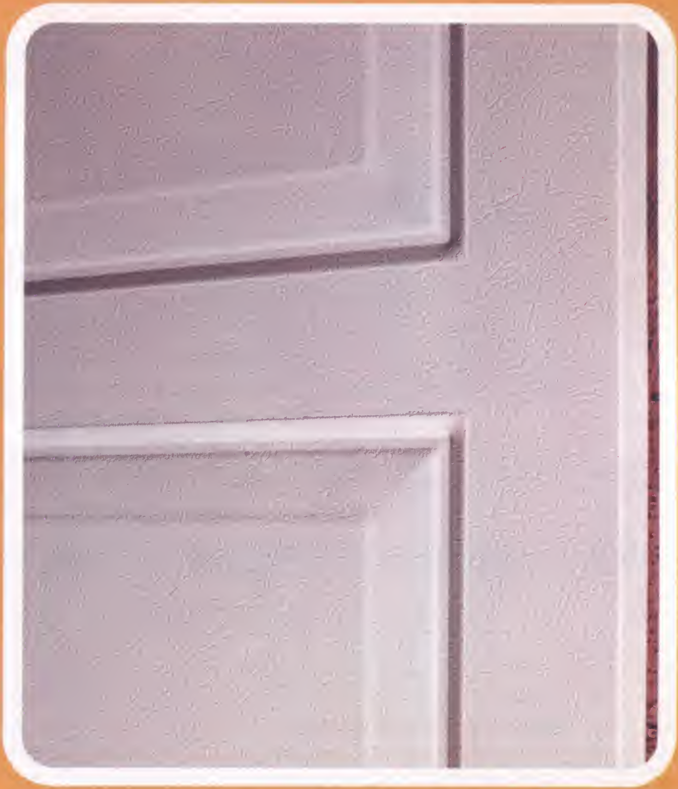
Full Louver. . . large air-flow capability provides maximum ventilation. Ideally suited for furnace room, laundry area or wherever maximum air movement is required. Sturdy steel FLOAT-AWAY Doors assure fire resistance and rugged durability.



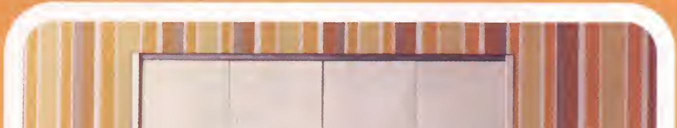
Colonial . . . light embossing creates unobtrusive panel design, while sturdy louvers allow free air-flow into closet. Ideal mating of beauty and function through attractive styling, durable construction, and superior design.



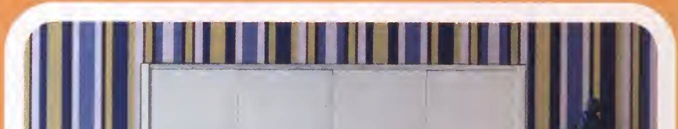
Concord . . . deeply-embossed doors resemble richly-carved wood, provide pleasing background for gracious living. Yet you save as much as **50%** in installed costs over wooden doors—avoid callbacks due to warping, unsatisfactory operation.



Concord Door with optional attractive texturing in luxurious, leather-like finish. Enhances decor with extra touch of charm.



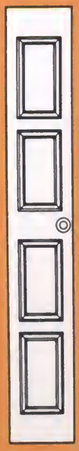
Georgetown . . . captures regal beauty of the past for contemporary enjoyment. Choice of standard or ceiling-high doors in this and other designs. Advantages of latter include increased usable shelf space and elimination of costly wall returns.

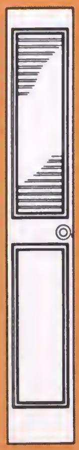


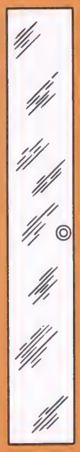
Flush . . . beautifully smooth surface continues uninterrupted expanse of wall line for effect of greater space. For custom decorating, cover surface with wallpaper, carpeting or original designs —newest styling mode for personalizing rooms!

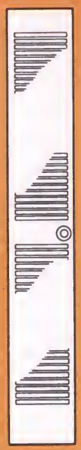
float-away Bi-fold Closet Door Styles

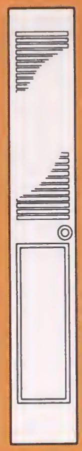
Available with mirrors or as a full-mirror bi-fold door

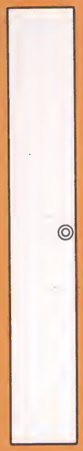

Concord

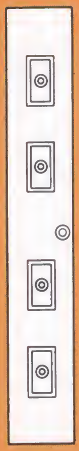

Savoy


Mirror


Louver


Colonial

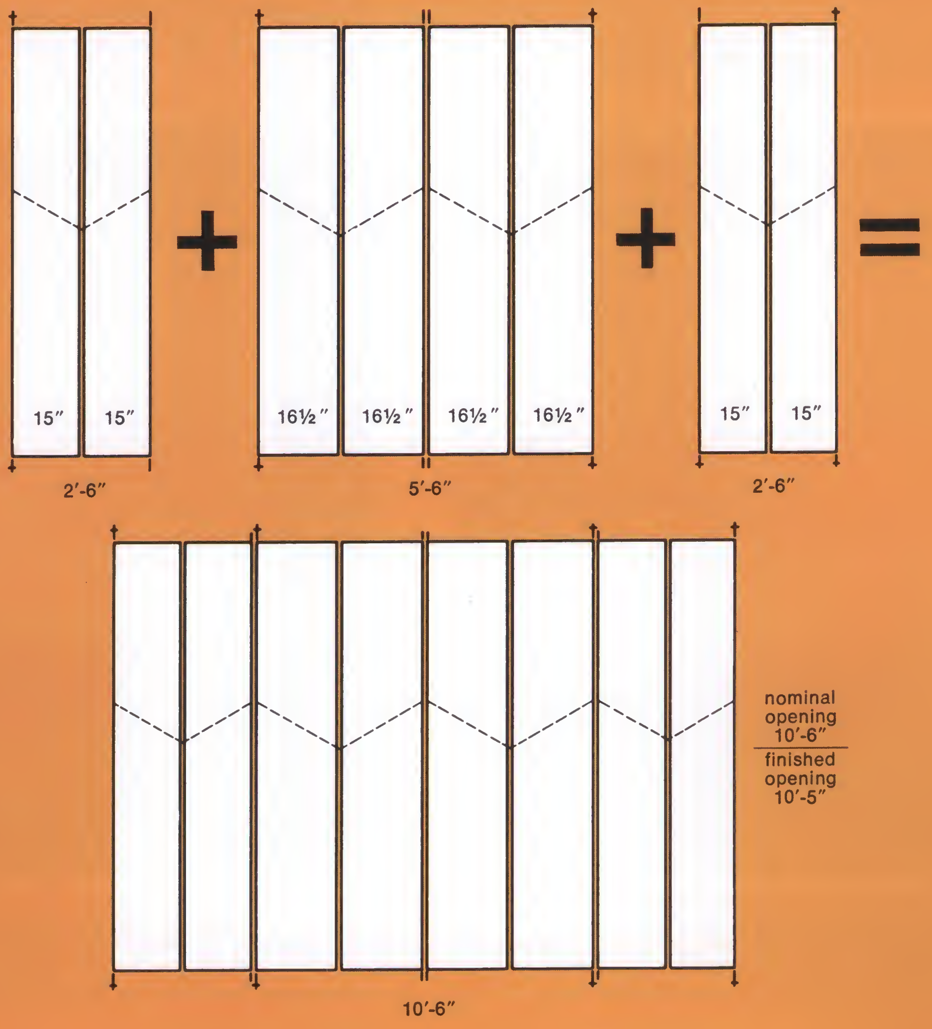

Flush


Georgetown

Door combinations for any opening

FLOAT-AWAY Doors fit virtually any opening width by using various combinations of 2-panel and 4-panel doors in multiple, in either identical or different sizes. Trim can compensate for slight construction inaccuracies and fractional width adjustments. Different designs can be intermixed in the same opening (especially Flush style with one of other designs), provided the arrangement is balanced in the opening to present a symmetrical appearance.

Standard 2-panel doors are available in nominal widths from 1′6″ to 3′0″; 4-panel from 3′0″ to 6′0″, all in 3″ increments. Non-standard widths available on special order. Table (right) shows standard-size combinations for openings wider than 6′0″. Normally 2-panel doors are recommended for 2′0″ to 2′6″ widths, 4-panel for 4′0″ to 5′0″.



nominal opening 10′-6″

finished opening 10′-5″

Specify your closet system this easy way...
Architectural Specifications

notes to architect

1. In coastal areas where salt content in the air is high, specify 24-ga. electro-galvanized enameled steel which offers increased protection against corrosion.

2. FLOAT-A-LEVEL top track is recommended for attachment to poured concrete ceilings.

3. Jamb trim should be used to improve the opening appearance.

4. To insure proper door operation, tracks should be masked before spray-painting or installed after painting is completed.

5. Do not remove doors and shelves from original packing for installation until *after* completion of wall and floor finishes. This assures items will retain their excellent finish and beauty.

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by FLOAT-AWAY Div. of Kinkead Industries and shall be installed in accordance with its current printed directions.

1.3 delivery and storage

All material shall be delivered in the original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather, the building shall be heated and ventilated during installation of bi-fold doors and closet shelves to maintain temperature and ventilation consistent with good working conditions for finish work.

Part 2: products

2.1 materials

a. FLOAT-AWAY bi-fold closet doors:

(1) Material and finish: 24-ga. bonderized (carbon steel) (electro-galvanized steel) having all surfaces uniformly coated with one coat electro-deposited baked-on enamel in bone-white color.

(2) Style: (Concord) (Savoy) (Flush) (Louver) (Colonial) (Georgetown) (Full Mirror)(1) (Concord/Mirror)(1)(2) (Savoy/Mirror)(1)(2) (Flush/Mirror)(1)(2) (Louver/Mirror)(1)(2) (Colonial/Mirror)(1)(2) (Georgetown/Mirror) (1)(2) with sound-deadening properties.

(1)Available with full-length mirror only.
(2)Mirror placed on lead panels only.

(3) Size: 2-panel width (1′6″) (1′9″) (2′0″)* (2′3″) (2′6″)* (2′9″) (3′0″)*; 4-panel width (3′0″) (3′6″) (4′0″)* (4′6″) (5′0″)* (5′6″) (6′0″)*; height (6′8″) (8′0″).

(Concord, Mirror style doors available only in asterisked widths.)

(4) Pivots and guides: bottom, threaded with lock nut and 7/8″ maximum adjustability; top, spring-loaded.

(5) Knobs: (brass-standard) (aluminum) (antique bronze).

(6) Full mirror handles: (satin aluminum—standard) (satin gold).

b. Guide track:

Extruded aluminum, mill finish; top, (FLOAT-A-MATIC) (FLOAT-A-LEVEL) type; bottom, FLOAT-A-MATIC type.

c. Jamb trim:

24-ga. bonderized enameled steel finished to match doors, width (1″) (1½″) (2″) (2½″) (3″) (3½″), height (6′8″) (8′0″).

d. Adjustable closet shelves

(1) Material and finish: 24-ga. bonderized enameled carbon steel having all surfaces uniformly coated with one coat electro-deposited baked-on enamel in bone-white color.

(2) Style: (clothing shelf with rod) (storage shelf) (linen shelf).

(3) Size: (clothing) (storage) shelves (12″) (14″) deep, (23½″—36½″) (35½″—48½″) (47½″—60½″) (59½″—72½″) (71½″—84½″) (83½″—96½″) adjustable width range; linen shelves 14″ deep, (17½″—30½″) (29½″—42½″) adjustable width range.

(4) Off-Wall Bracket for (12″) (14″) deep shelves.

Part 3: execution

FLOAT-AWAY bi-fold doors, closet shelves and accessories shall be installed in accordance with current printed instructions of FLOAT-AWAY Division, Kinkead Industries.

float-away Closet Doors fit virtually any opening

STANDARD DOOR SIZES

DOOR SIZE	NO. OF PANELS	FINISH OPENING WIDTH	FINISH OPENING HEIGHT	DOOR SIZE	NO. OF PANELS	FINISH OPENING WIDTH	FINISH OPENING HEIGHT*
1′-6″ x 6′-8″	2	18½″	80¾″	1′-6″ x 8′-0″	2	18½″	95¼″
1′-9″ x 6′-8″	2	21½″	80¾″	1′-9″ x 8′-0″	2	21½″	95¼″
2′-0″ x 6′-8″†	2	24½″	80¾″	2′-0″ x 8′-0″†	2	24½″	95¼″
2′-3″ x 6′-8″	2	27½″	80¾″	2′-3″ x 8′-0″	2	27½″	95¼″
2′-6″ x 6′-8″†	2	30½″	80¾″	2′-6″ x 8′-0″†	2	30½″	95¼″
2′-9″ x 6′-8″	2	33½″	80¾″	2′-9″ x 8′-0″	2	33½″	95¼″
3′-0″ x 6′-8″†	2	36½″	80¾″	3′-0″ x 8′-0″†	2	36½″	95¼″
3′-0″ x 6′-8″	4	36″	80¾″	3′-0″ x 8′-0″	4	36″	95¼″
3′-6″ x 6′-8″	4	42″	80¾″	3′-6″ x 8′-0″	4	42″	95¼″
4′-0″ x 6′-8″†	4	48″	80¾″	4′-0″ x 8′-0″†	4	48″	95¼″
4′-6″ x 6′-8″	4	54″	80¾″	4′-6″ x 8′-0″	4	54″	95¼″
5′-0″ x 6′-8″†	4	60″	80¾″	5′-0″ x 8′-0″†	4	60″	95¼″
5′-6″ x 6′-8″	4	66″	80¾″	5′-6″ x 8′-0″	4	66″	95¼″
6′-0″ x 6′-8″†	4	72″	80¾″	6′-0″ x 8′-0″†	4	72″	95¼″

*For 7′-6″ high doors, finish height is 89¼″. †Concord and Mirror Doors available only in these sizes.

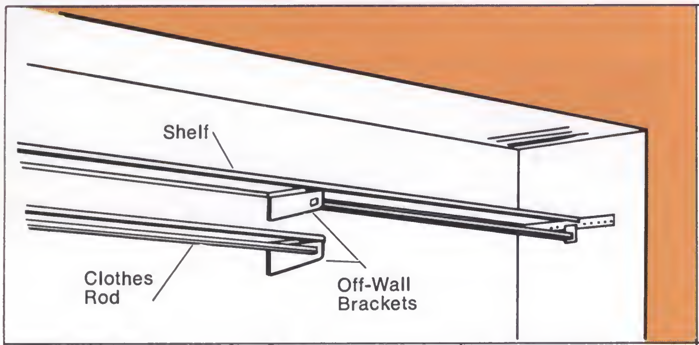
Adjustable Shelves...
deluxe shelving for closet storage—at low cost!

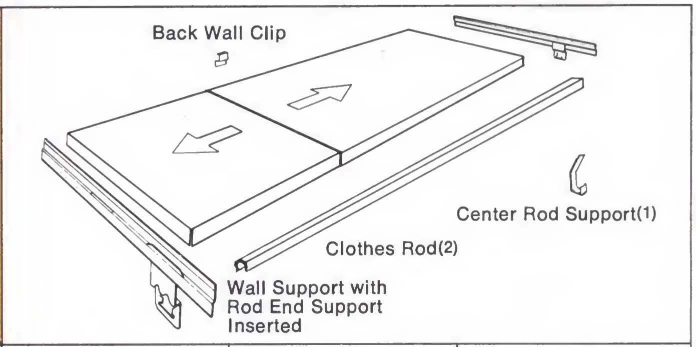
Perfect mate to FLOAT-AWAY Doors, these adjustable, all-steel shelves give you a completely integrated closet system. Sturdy prepainted shelves install in minutes with the smart look of decorator beauty. No cutting . . . no sawing . . . no fitting . . . no painting . . . *no dangerous sharp edges*—installation right now!

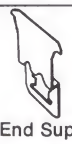
Plated bone white enamel finish matches FLOAT-AWAY Doors, has same lustrous, mar-resistant coating that won't chip or crack even if dented with a hammer. Adjustable shelves expand for precise fit . . . turn corners . . . mount in tiers . . . attain any continuous length desired . . . utilize full closet storage capacity.

Choice of six different shelf lengths, ranging from 24" to 96" (expanded), in selection of three types—clothing, storage and linen closet shelves. With Off-Wall Brackets, shelves connect together to any length required or allow positioning shelf between walls. Clothing and storage shelves available in 12" and 14" depths, 1⅛" thick. Linen shelves available in 14" depth, ⅝" thick. Heavily nickel-plated adjustable clothes rod adds luxury appearance, won't rust or tarnish, resists scratching by clothes hangers.

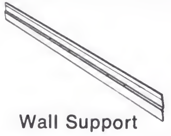
Easily-installed Adjustable Shelves and Rods quickly customize closet interiors for greater utility.



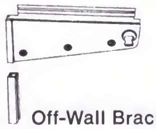




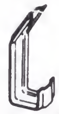
Rod End Support(2)



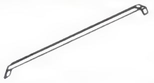
Wall Support



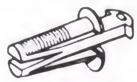
Off-Wall Bracket(3)



Center Rod Support(1)



Center Shelf Support(1)
(for 12" or 14" depth)



Jif-Lock
Drive Fastener(3)

(1) Included with 60" to 72" and larger sizes.(2) Included with all clothing shelves.(3) Available separately. Sets are complete with all parts, fasteners.

Shelving sizes to fit all requirements

Clothing Shelves and Storage Shelves, in choice of 12" and 14" depths, are available with following minimum-maximum extension:

23½"—36½"
35½"—48½"
47½"—60½"
59½"—72½"
71½"—84½"
83½"—96½"

Linen Shelves, in 14" depth only, are available with the following minimum and maximum extension:

17½"—30½"
29½"—42½"

For further information, call or write:
KINKEAD INDUSTRIES INCORPORATED
1123 Zonolite Rd., N.E., Atlanta, Ga. 30306. Phone: (404) 875-8021
or 5860 N. Pulaski Rd., Chicago, Ill. 60646. Phone: (312) 463-7800.

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KINKEAD

KEWANEE

STEEL DOORS & FRAMES

with full flush seamless construction

8.2/Ke

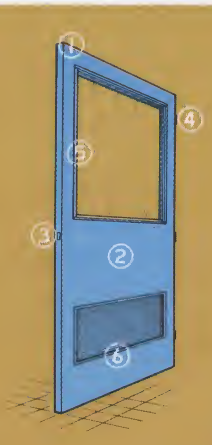
KEWANEE MFG. DIVISION
1976—1

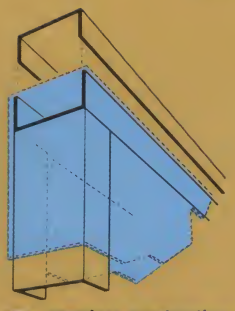
8 P

METAL DOORS & FRAMES
hollow, flush, fire-rated

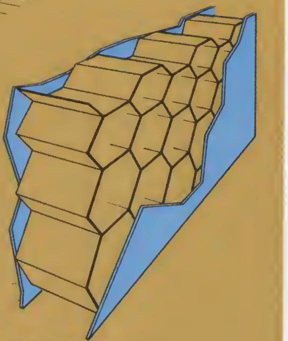
UNITED STATES GYPSUM

"QUALITY TO THE CORE" FEATURES OF **KEWANEE** STEEL DOORS

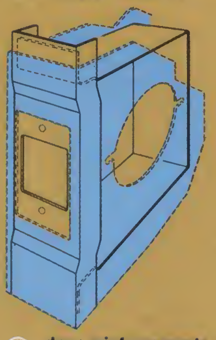




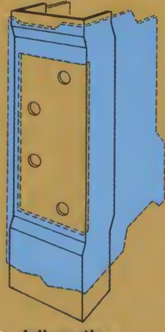
① seamless construction, integral channels



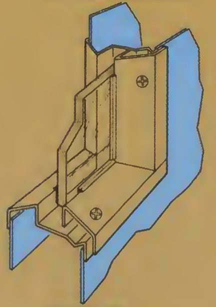
② small cell honeycomb core



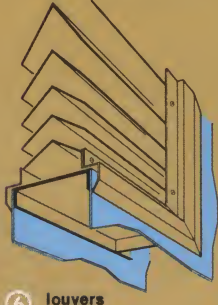
③ door reinforcements for most hardware



④ full mortise hinge reinforcement



⑤ two-piece steel glazing bead



⑥ louvers

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Doors, general	2-6
Typical Kewanee installations	3
Doors, fire-rated	7
Frames	8-10
Anchorage	10
Stick systems	11
Specifications	11-12

Types for every requirement; styles for every preference . . .

- steel doors
- frames
- fire-rated doors & frames
- stick systems

Throughout the building industry, Kewanee is recognized for quality in its variety of honeycomb core, full flush *seamless* steel doors in standard and labeled types, styles and sizes. Offered with these are companion lines of both conventional and patented, quickly-installed frames plus architectural stick systems. The products suit apartments, motels, schools, hospitals and other buildings from industrial to monumental. All incorporate Kewanee built-with-care quality, precision fabrication and patented design features developed in a half-century of experience. Included are:

- Standard doors—series 400, 800
- Labeled doors—series ULH-400, FMH-400
- Frames—three series (F-Line, Pan-L-Fit, Kwik-Fit); labeled frames
- Styles and options to suit most requirements
- Stick systems—custom-fabricated for special entrances

Kewanee doors incorporate premium-quality construction and design features that pay off in long, trouble-free service, even under the most demanding heavy-duty usage.

Rugged construction

- **Full flush seamless construction**—all welds filled and ground smooth for fine appearance and moisture protection, yet competitive in cost
- **Small cell, phenolic honeycomb core**—adhesive bonding to skin sheets under heat and high pressure creates assembly that resists denting, reduces sound transmission and retains permanent flatness
- **20-, 18-, 16-ga. skin sheets**—thickness matched to impact and service
- **Integral hardware reinforcements**—full-length channels distribute stresses throughout door
- **Crisp edges, precision fabrication**—proper fit and smooth operation assured

Versatile function

- **Choice of finishes**—baked-on prime coat ready for finish-painting, three standard finish colors optional
- **Choice of hardware**—most brands compatible with standard door reinforcements
- **Wide variety**—sizes and styles for every requirement, many factory-stocked
- **Fire ratings**—doors and frames labeled in both UL and FM classifications
- **Clean, finished glazing**—two-piece steel glazing bead installs fast
- **Frames for every wall**—patented features provide 5-min. installation *after* the wall is up

Local service

- **Dealer stocks**—most standard doors and frames
- **Custom fabrication**—architectural stick systems and special conditions
- **Dealers factory-trained**—Kewanee expertise locally available for consultation

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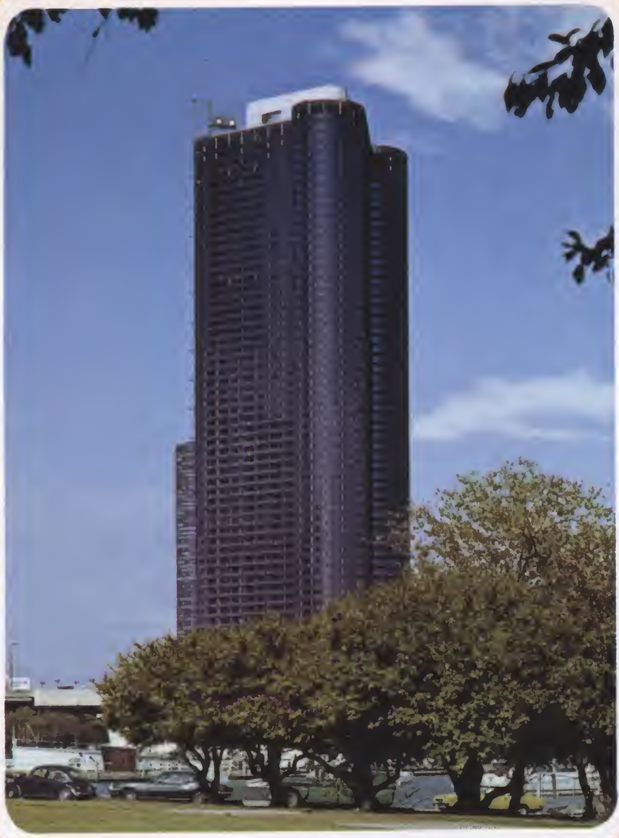
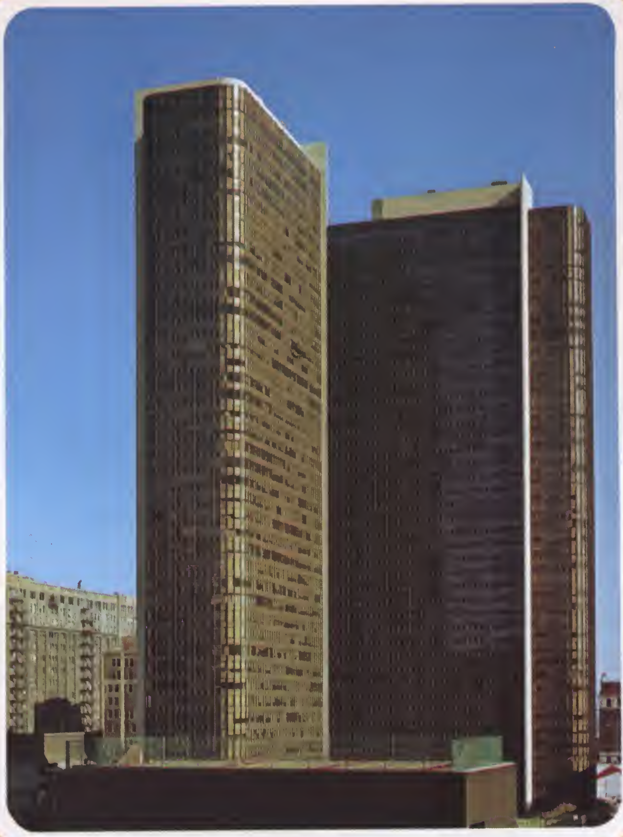
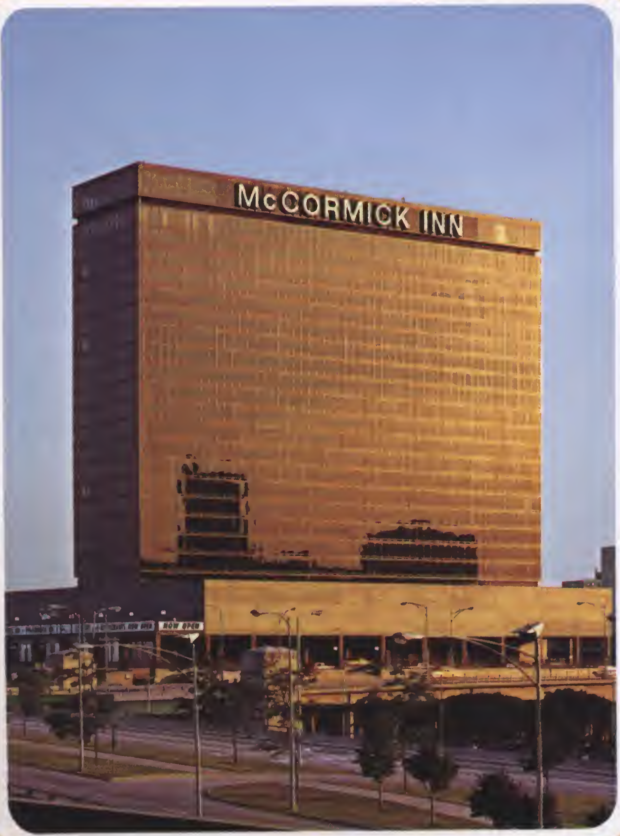


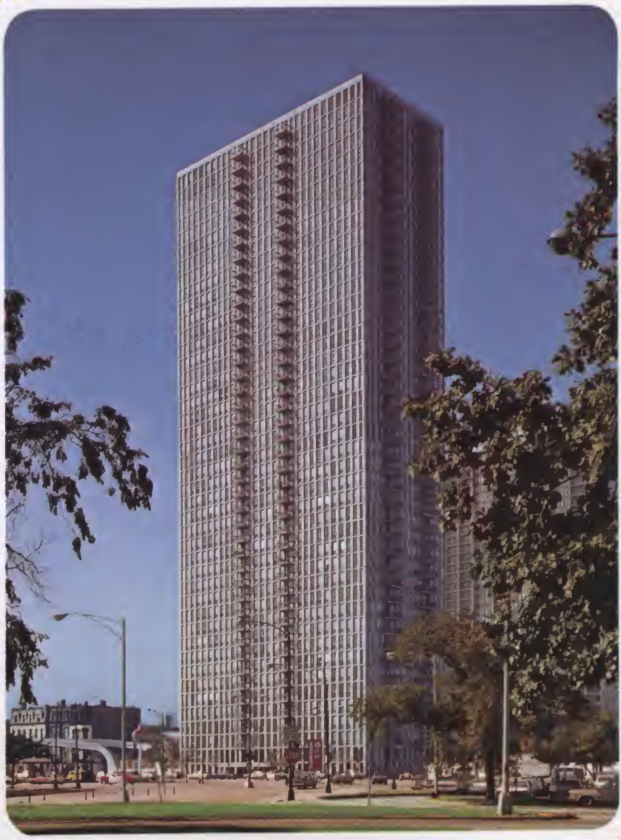
HARBOR POINT CONDOMINIUM
Architects: SOLOMON, CORDWELL, BUENZ & Assoc., Inc.



McCLURG COURT CENTER
Architects: SOLOMON, CORDWELL, BUENZ & Assoc., Inc.



McCORMICK INN
Architects-Engineers: A. EPSTEIN & SONS, Inc.
Associate Architect: JOHN HEINRICH, AIA



EUGENIE SQUARE
Architects-Engineers: DUBIN, DUBIN, BLACK & MOUTOUSSAMY

doors

description

Kewanee standard doors are offered in Series 400 and 800, 1¾″ and 1⅜″ thick, respectively. Series 400 is available in 20-, 18-, or 16-ga. skin thicknesses, and with labels for fire-rated requirements, Series 800 with 20-ga. skin sheets only. The last two digits in each door number indicate skin sheet gauge. All are supplied with cut-out and fully factory-reinforced, drilled and tapped for lockset and hinges, reinforced only for surface-mounted closer (except Series 820). All 6′8″ high doors prepared for cylindrical lockset are reversible, others are handed. All doors are available with zinc-coated steel skin sheets on special order. Steel, screw-attached glazing beads are supplied in a bevel profile with glazed styles.

Pairs of doors are supplied with right-hand leaf active and prepared for lock, inactive leaf reinforced for top and bottom surface bolts and prepared for ASA115.1 strike plate. Astragals furnished as standard with UL-labeled pairs only.

Standard options available include: preparations for surface-mounted closers (on Series 820), door holders, flush bolts on inactive leaves and panic hardware, steel flush top and bottom channels, special marking and louvers.

series selection & use

Series 400 Doors are suitable for either exterior or interior use, with the choice of skin sheet gauge dependent on frequency of use and degree of impact resistance required. Series 416 doors should be used where subjected to both frequent use and high impact, such as main entrances to public buildings; Series 418 where impact is less severe and frequency moderate to high, as in most interiors; Series 420 where impact and abuse are light and frequency of use moderate.

Series ULH-400 and **FMH-400 Labeled Doors,** for fire-rated locations where UL or FM labels are required, should also be selected according to the criteria above unless the label requires a greater minimum.

Series 820 Doors are intended only for interiors, and for low-frequency use where impact and abuse are light. Closet and utility room doors are examples of ideal applications.

Select the appropriate door series and style for each door opening. See chart on page 5 for complete listing of sizes available, also Label Door Selector chart on page 7 for availability of sizes and styles qualifying for various labels.

styles

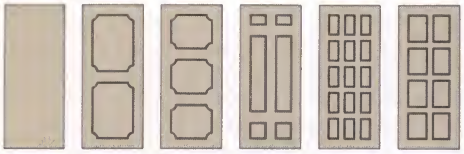
Shown here are various Flush, Decor, Vision, Glass, Narrow Light and Dutch door styles available in all series—a style for virtually every requirement. Styles D1 through D5 are actually M Style doors with mouldings surface-applied by the Kewanee dealer.

door physical data

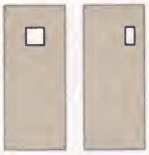
description	series 420 418 416	series ULH-420 ULH-418 ULH-416	series FMH-420 FMH-418 FMH-416	series 820
door sizes/styles	(see Door Avail. chart)	(see Door Avail. chart)	420/418/416 single doors 418/416 door prs. in qualifying sizes, M style (see Door Avail. chart)	(see Door Avail. chart)
labels	none	UL: A,B,C,D,E	FM: ¾, 1½, 3 hr.	none
thickness	1¾″	1¾″	1¾″	1⅜″
skin sheets (ga.)	20, 18, 16	20, 18, 16	20, 18, 16	20
perimeter channels (ga.)	14	14	14	16
standard template hinge reinforcement (1)	1½ pr. 4½″ x 4½″	1½ pr. 4½″ x 4½″	1½ pr. 4½″ x 4½″	1½ or 1 pr.(1) 3½″ x 3½″
lock reinforcements	Govt. #161 or Govt. #86	Govt. #161 or Govt. #86	Govt. #161 or Govt. #86	Govt. #160
lock edge bevel	⅛″ in 2″	⅛″ in 2″	⅛″ in 2″	square
clearances	(2)	(2)	(2)	(2)
finish	(3)	(3)	(3)	(3)
glazing beads	steel, screw-attached, bevel profile	steel, screw-attached, bevel profile	steel, screw-attached, bevel profile	steel, screw-attached, bevel profile
compatible frames	F418, F416 PF418, PF416	ULF-416 ULPF-416	FM416	F818 PF818

(1) 1½ pr. all doors, except 1 pr. Series 820 door 6′8″ high. (2) All doors: sill ¾″, head ⅛″, hinge stile lock stile ⅛″. (3) Standard finish: cleaned, phosphatized, baked-on gray enamel prime coat; finish coat available in Dark Bronze, Beige, Autumn Brown and Black on quantity orders (contact Kewanee for required minimum).

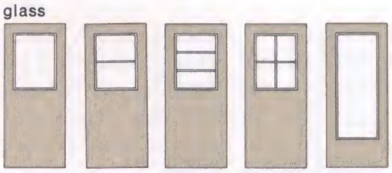
flush & decor



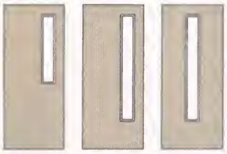
vision



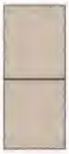
glass



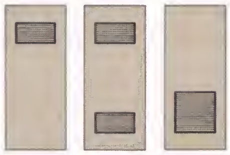
narrow light



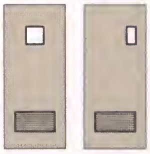
dutch



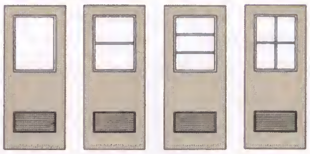
flush louvered



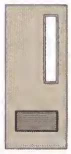
vision louvered



glass louvered



narrow-light louvered



door availability/glass sizes(1)

door (2) size ↓ style →	flush	vision		glass					narrow light		dutch
	M	V	V 5x10	G	G2	G3	G4	FG	NL	LNL LNL/C	DD
6′8″ high											
2068	(no glass)	10x10	5x10	12x28			12x28	12x57⅝	7¼x35¼	7¼x57⅝	(no glass)
2468				16x28			16x28	16x57⅝			
2668				18x28			18x28	18x57⅝			
2868				20x28			20x28	20x57⅝			
3068				24x28			24x28	24x57⅝			
3468				28x28			28x28	28x57⅝			
3668				30x28			30x28	30x57⅝			
3868				32x28			32x28	32x57⅝			
4068				36x28			36x28	36x57⅝			
7′0″ high											
2070	(no glass)	10x10	5x10	12x32			12x32	12x61⅝	7¼x39¼	7¼x61⅝	(no glass)
2470				16x32			16x32	16x61⅝			
2670				18x32			18x32	18x61⅝			
2870				20x32			20x32	20x61⅝			
3070				24x32			24x32	24x61⅝			
3470				28x32			28x32	28x61⅝			
3670				30x32			30x32	30x61⅝			
3870				32x32			32x32	32x61⅝			
4070				36x32			36x32	36x61⅝			
7′2″ high											
2072	(no glass)	10x10	5x10	12x34			12x34	12x63⅝	7¼x41¼	7¼x63⅝	(no glass)
2472				16x34			16x34	16x63⅝			
2672				18x34			18x34	18x63⅝			
2872				20x34			20x34	20x63⅝			
3072				24x34			24x34	24x63⅝			
3472				28x34			28x34	28x63⅝			
3672				30x34			30x34	30x63⅝			
3872				32x34			32x34	32x63⅝			
4072				36x34			36x34	36x63⅝			
8′0″ high											
2080	(no glass)	10x10	5x10	12x44			12x44	12x73⅝	7¼x51¼	7¼x73⅝	(no glass)
2480				16x44			16x44	16x73⅝			
2680				18x44			18x44	18x73⅝			
2880				20x44			20x44	20x73⅝			
3080				24x44			24x44	24x73⅝			
3480				28x44			28x44	28x73⅝			
3680				30x44			30x44	30x73⅝			
3880				32x44			32x44	32x73⅝			
4080				36x44			36x44	36x73⅝			

(1) Size in inches, **exposed** glass area (not actual pane size). (2) Pairs of doors available on same basis as single doors of same size/style door leaf.

doors

stock blank doors

The Kewanee stock blank door is unique and highly versatile. Available in Series 418, M style, it is stocked for use as a single door, active leaf of a pair of doors, or inactive leaf with or without the Kewanee stock conversion astragal. It may be used for the following door functions when equipped with hardware combinations listed:

- **single door**
  —with push-pull or rim panic device
- **single door or active leaf**
  —with Govt. #86 mortise lock with sectional trim, or mortise panic device
  —with deadlock
- **inactive leaf**
  —with push-pull or rim panic device
  —with ASA flush bolts, and ASA 115.1 or deadlock strikes
  —with surface bolts

handing

Door hand is determined by noting hinge location when door opens *away* from viewer, i.e. if hinge jamb is on his right, it is a right-hand door. In the case of pairs of doors, hand is determined from the *active* leaf in the same way. Door hand, as determined above, must be specified on orders.

Proper handing for *hardware* is determined in the same way, but by viewing from the *security* or keyed side. If the door opens *away* from the viewer as before, handing is identical; if door opens *toward* viewer, handing changes and hardware must be ordered for a "reverse bevel" door. Thus, a "right-hand" door is, for hardware purposes a "left-hand reverse bevel" door, and vice versa. This paradox occurs whenever the *security* side of a door opens *toward* the viewer. The security side of a communicating door is the side from which hinges are not visible when door is closed; for bathroom, bedroom and closet doors, security is on the room side.

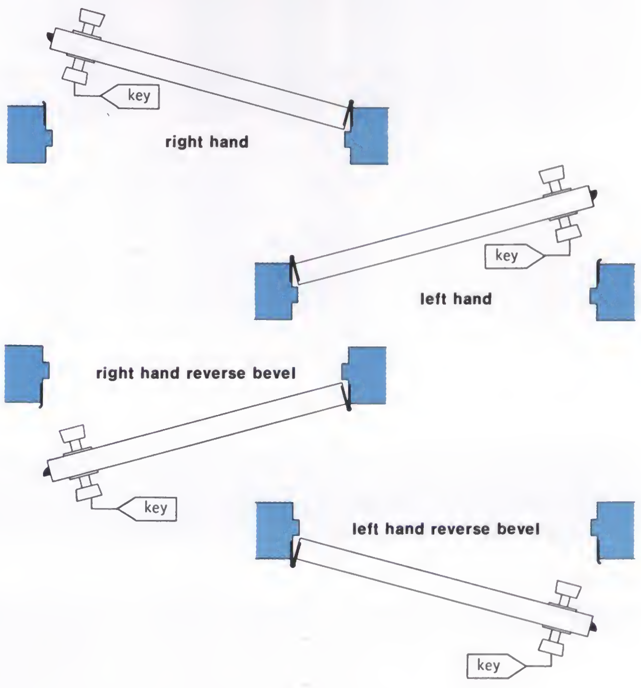
louvers

Kewanee offers both commercial and pierced louvers for all door series, in two standard sizes of each type. Other sizes are available on special order. They can be furnished in standard doors of sizes and styles indicated in the Door Availability chart on page 5, and UL- or FM-labeled doors as qualified in Label Door Selector chart on page 7. See chart below for free air area and sizes.

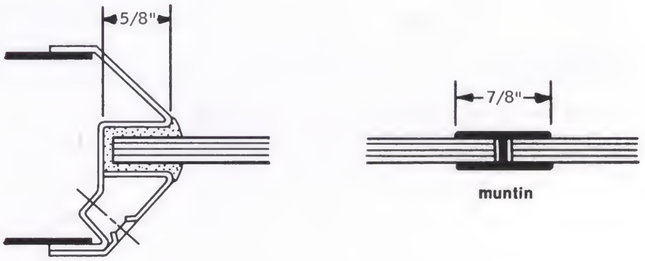
louver physical data

louver		door size	free air area (sq. in.)
type	size		
commercial	2'w. x 2'h.	see Door Avail. chart	374
	2'w. x 1'h.		137
pierced	14"w. x 7"h.	2'4"w. min.	30
	8"w. x 7"h.	2'0"w.	17

swing diagram



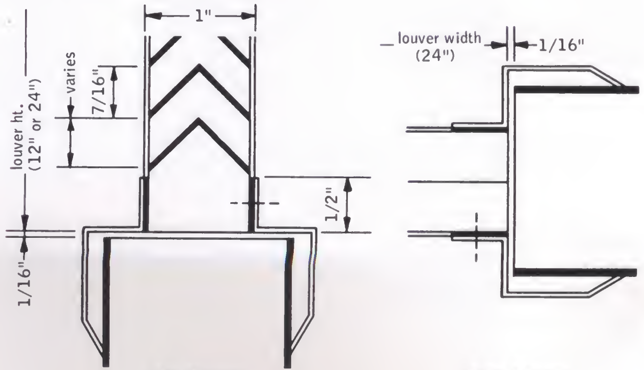
glazing details



muntin

bevel profile
steel glazing bead

commercial louver details



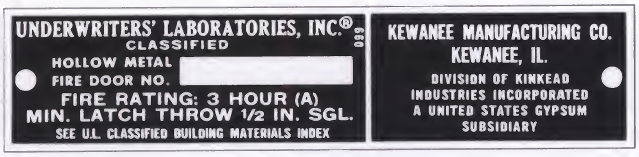
sill section
(head similar)

jamb section

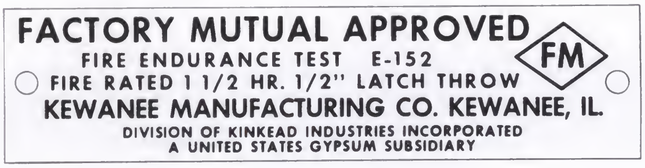
fire-rated doors

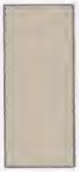
description

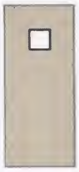
Kewanee offers a full line of fire-rated doors both UL and FM labeled (Series ULH-400 and FMH-400). They are available in A, B, C, D, E label classifications for UL, and 3, 1½, or ¾-hr. for FM. The Label Door Selector chart shows door applications, sizes and styles qualifying for the various labels. Fire-rated doors are prepared for hardware required for label qualification; check local codes for specific hardware requirements of various labels and door applications. Clearances are within fire-rated door limits.

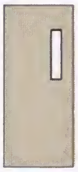

UNDERWRITERS' LABORATORIES, INC.®
CLASSIFIED
HOLLOW METAL
FIRE DOOR NO.
FIRE RATING: 3 HOUR (A)
MIN. LATCH THROW ½ IN. SGL.
SEE U.L. CLASSIFIED BUILDING MATERIALS INDEX
699

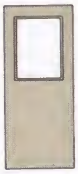
KEWANEE MANUFACTURING CO.
KEWANEE, IL.
DIVISION OF KINKEAD
INDUSTRIES INCORPORATED
A UNITED STATES GYPSUM
SUBSIDIARY

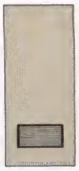

FACTORY MUTUAL APPROVED
FIRE ENDURANCE TEST E-152
FIRE RATED 1 1/2 HR. 1/2" LATCH THROW
FM
KEWANEE MANUFACTURING CO. KEWANEE, IL.
DIVISION OF KINKEAD INDUSTRIES INCORPORATED
A UNITED STATES GYPSUM SUBSIDIARY

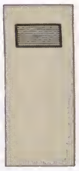

M


V


NL (5x20)


G


BL


TL

label door selector(1)

door style	class A (3-hr.) Uses: In walls separating buildings; high-hazard storage & process areas	class B (1½-hr.) Uses: Vertical shaft enclosures such as stairwells, elevators & trash chutes	class C (¾-hr.) Uses: Corridors & room partitions	class D (1½-hr.) Uses: Exterior walls with severe fire exposure on outside	class E (¾-hr.) Uses: Exterior walls with moderate fire exposure on outside
single door (non-louvered)					
M	418/416: 4080 max.	418/416: 4080 max.; 420:3872 max.	418/416:4080 max.; 420:3872 max.	418/416:4080 max.	418/416:4080 max.; 420:3872 max.
V	–			–	
NL (5x20)	–			–	
G	–	–	418/416: 4080 max.; 420:3872 max.	–	420/418/416:4080 max., with max. 720 sq. in. exposed glass
single door (louvered)					
BL	–	418/416:3676 max.; 420:3672 max.; 24x24 louvers, max.	418/416:3676 max.; 420:3672 max.; 24x24 louvers, max.	–	–
TL	–			–	–
pair of doors (non-louvered only, louvered do not qualify)					
all styles	same as single door except 7472 max.	same as single door except 420 does not qualify	same as single door except 420 does not qualify	same as single door except 420 does not qualify	same as single door except 420 does not qualify

---

(1) Door qualifications shown are based upon UL limitations which include the following:
Max. exposed glass area—Classes A & D, none allowed; Class B, 100 sq.-in./light; Class C, 1296 sq.-in./light; Class E, 720 sq.-in./light; Classes B & C, louvers may be used in place of glazing (not both). Lock throw—½" or ⅝" on single doors, ⅝" only on pairs of doors.

See Underwriters Laboratories Building Materials List for complete UL limitations, also local code restrictions on fire-rated doors, frames, hardware, glass and accessories.

frames

description

Kewanee frame design effectively mates door with wall. Frames are built to the same high standards of design, materials and workmanship as Kewanee doors, assuring precise door fit and smooth operation. This has resulted in three versatile series of steel door frames: Pan-L-Fit and SP/Kwik-Fit Frames, with labor-saving patented design features to simplify installation, and F-Line Frames.

Both Pan-L-Fit and SP/Kwik-Fit Steel Door Frames are designed for installation into panel-type walls—*after* the walls are in place. Only four screws or nails, and five minutes or less of installation time are required per frame. There are no cost-incurring buck-ups or ceiling struts to install, or obstruct the working area; no time lost to plumb the frame. Instead of building the wall to the frame, as is usually done, Pan-L-Fit and SP/Kwik-Fit Frames are installed *after* the wall is completed. An extra return on the backband permits installation without gouging wall panels. Fitting wall panels into frames, especially troublesome when close together or near corners, is eliminated. Cutting rough door openings is simplified: panels are cut to the opening *after* being placed. Since frames don't interfere with wall erection, the result is better-built walls with a minimum of patches and taped joints. A plumb, true and square door opening is assured (critical to pre-machined doors) and with less reliance on mechanics' skills.

The key to the efficient Pan-L-Fit and SP/Kwik-Fit Frame installation is the patented compression lug. After instllation of hinge jamb, head and strike jamb in sequence, the lug simultaneously locks the miters and secures the frame in place by the twist of a single compression screw.

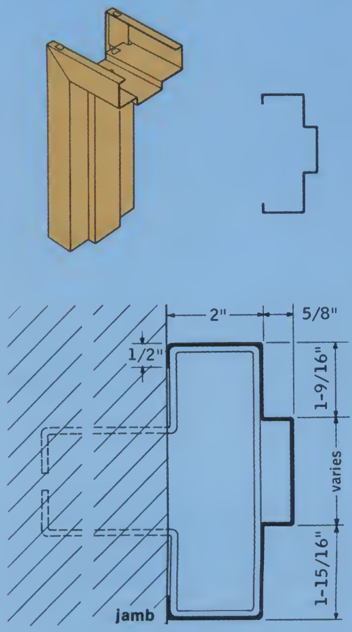
Pan-L-Fit Frames are intended for panel-type walls of all types, SP/Kwik-Fit Frames only for drywall construction—exceptionally economical installations. F-Line frames are available, with several types of anchorage, for all types of wall construction.

frame physical data

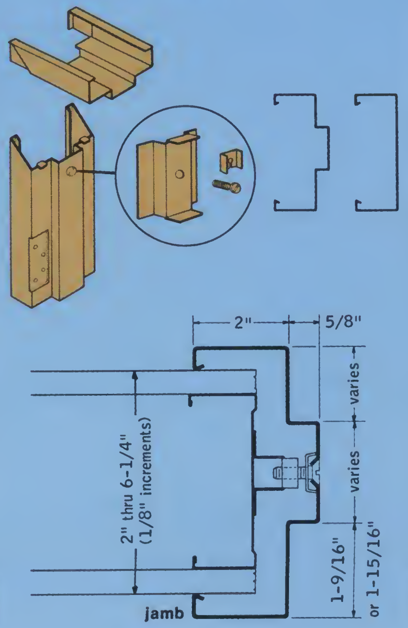
description		F-Line					PAN-L-FIT•					SP/KWIK-FIT		
		F416	F418	ULF416	FM416	F818	PF-416	PF-418	ULPF-4	PF-818	P18	SP/KF-4	SP/KF-8	SP/K
type														
labels available		–	–	x	x	–	–	–	x	–	–	–	–	–
swing door	sgl. door	x	x	x	x	x	x	x	x	x	–	x	x	–
	pr. of doors	x	x	x	x	x	x	x	–	x	–	x	x	–
cased opening	casing only	x	–	–	–	–	–	–	–	–	x	–	–	x
	w/slid. door hdwe.	–	–	–	–	–	–	–	–	–	–	–	–	(8)
communicating (sgl. doors)		x	x	x	x	x	x	x	–	x	–	–	–	–
double egress (pr. of doors)		–	–	x	–	–	–	–	–	–	–	–	–	–
transom (sgl., pr. of doors)		x	–	x	x	–	x	x	–	–	–	–	–	–
construction														
integral type		x	x	x	x	x	x	x	x	x	x	x	x	x
metal thickness (ga., exc. as noted)		16	18	16	16	18	16	18	16	18	18	.027"	.027"	.027"
reinforcements	hinge	4½x4½, 7-ga.				(1)	4½x4½, 7-ga.			(1)	–	(6)	(5)	–
	strike (2) (3)	(2)	(2)	(2)	(2)	(3)	(2)	(2)	(2)	(3)	–	(7)	(7)	–
strike plates		none furnished					none furnished				–	x	x	–
optional preparations	door closer	surface-mtd. reinforcing only					surface-mtd. reinforcing only					not recommended		
	door holder	surface-mtd. reinf. to template					surface-mtd. reinf. to template				–	–	–	–
	flush bolt	ASA 115.4 conformance					ASA 115.4 conformance				–	–	–	–
	panic hdwe.	mortise, rim or vertical rod reinforced									–	–	–	–
type assembly		KD (interlocking tabs) or welded					KD (no tabs needed)					KD (no tabs needed)		
optional finish (4)		none					fin. coat: dark bronze, beige, autumn brown, black					fin. coat: dark bronze, beige, aut. brown, black		

(1) 3½"x3½", 11-ga.; 1 pr. for 6'8" high, 1½ pr. for other. (2) 14-ga. ASA 115.1, 4⅞". (3) 14-ga. ASA 115.3, 2¾". (4) Subject to minimum quantity of one color (contact Kewanee); standard finish is cleaned, posphatized and baked-on gray enamel prime coat, except SP/KWIK-FIT Series which is standard zinc-coated steel. (5) Punched and embossed for 1 pr. 3½"x3½". (6) Punched and embossed for 1½ pr. 3½"x3½". (7) Punched, embossed and provided with brass strike plate in aluminum, bronze or chrome finish. (8) With sliding door hardware becomes SP/KWH Frame, see Frame Availability chart.

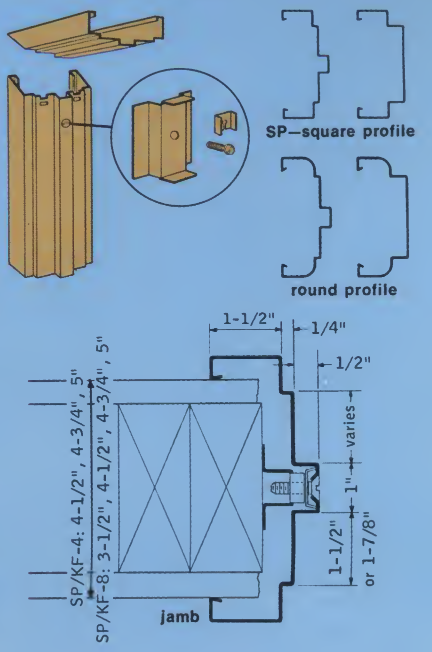
F-Line



PAN-L-FIT

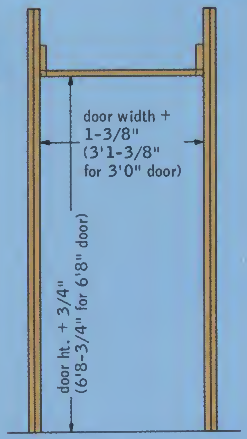


SP/KWIK-FIT

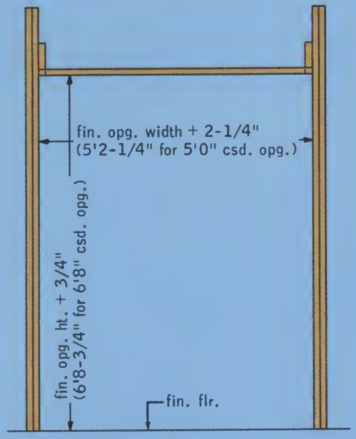


rough openings

PAN-L-FIT frames

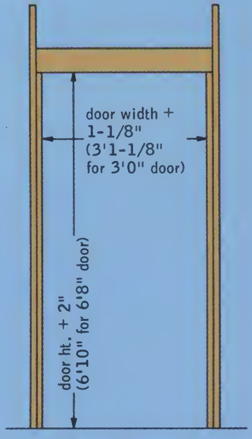

door width + 1-3/8" (3'1-3/8" for 3'0" door)
door ht. + 3/4" (6'8-3/4" for 6'8" door)

swing door

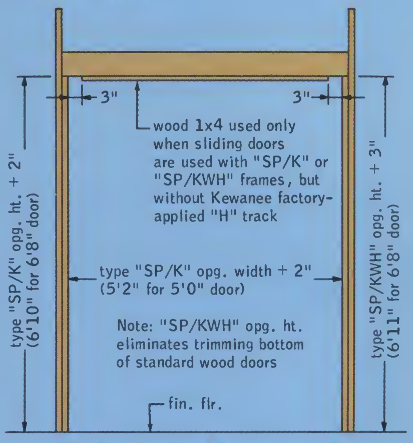

fin. opg. width + 2-1/4" (5'2-1/4" for 5'0" csd. opg.)
fin. opg. ht. + 3/4" (6'8-3/4" for 6'8" csd. opg.)
fin. flr.

cased opening

SP/KWIK-FIT frames

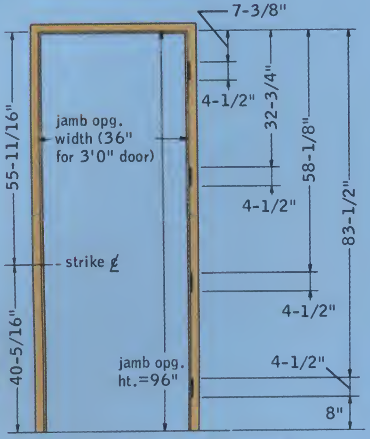

door width + 1-1/8" (3'1-1/8" for 3'0" door)
door ht. + 2" (6'10" for 6'8" door)

swing door

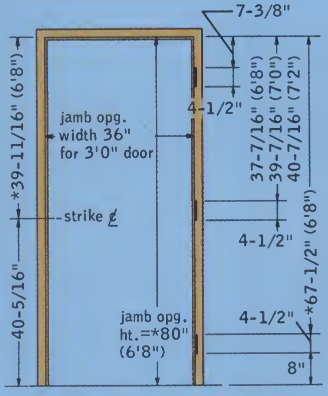

3"
3"
wood 1x4 used only when sliding doors are used with "SP/K" or "SP/KWH" frames, but without Kewanee factory-applied "H" track
type "SP/K" opg. width + 2" (5'2" for 5'0" door)
Note: "SP/KWH" opg. ht. eliminates trimming bottom of standard wood doors
type "SP/K" opg. ht. + 2" (6'10" for 6'8" door)
type "SP/KWH" opg. ht. + 3" (6'11" for 6'8" door)
fin. flr.

cased opening & sliding doors

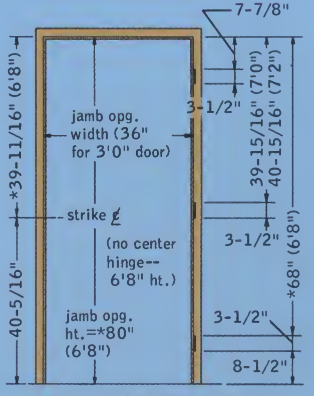
strike & hinge locations



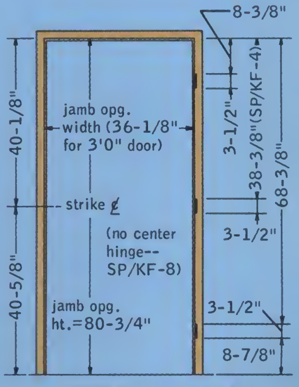
F-Line/PAN-L-FIT frames(1)
1¾" doors



F-Line/PAN-L-FIT frames(1)
1¾" doors



F-Line/PAN-L-FIT frames(1)
1⅜" doors



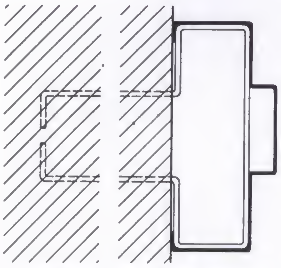
SP/KWIK-FIT frames
1⅜" & 1¾" doors

(1)Dimensions for 6'8" to 7'2" heights or as noted;
(*)indicates 6'8" height dimensions which increase 4" and 6", for 7'0" and 7'2" heights, respectively.

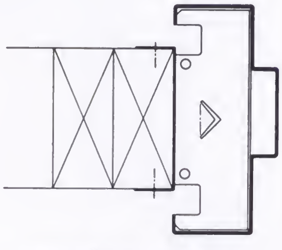
frames & anchorage

anchor clips

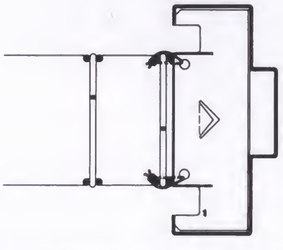
Kewanee offers various types of anchors for tying in F-Line Frames to all types of wall construction, available for frames of 4¾″, 5¾″, 6¾″ and 8¾″ jamb depths.



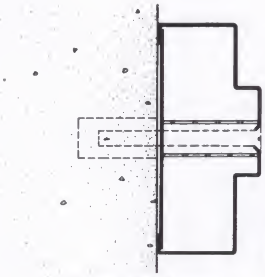
masonry wire anchor



#A3285 anchor—wood studs



#A3285 anchor—TRUSSTEEL® studs



UL concrete anchor

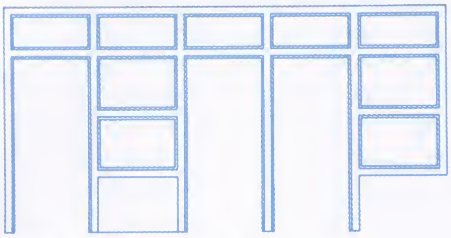
frame availability (1)—jamb depths/wall thicknesses (in., nom.)

frame series	F-Line frames (jamb depth)					PAN-L-FIT frames (wall thickness) (3)					SP/KWIK-FIT frames (wall thickness)		
	1¾″ doors				1⅜″ doors	1¾″ doors			1⅜″ doors	cased opg.	1¾″ doors	1⅜″ doors	cased opg.
			labels					labels					
door leaf size (1)	F416	F418	ULF416	FM416	F818	PF416	PF418	ULPF-4	PF-818	P18	SP/KF-4	SP/KF-8	SP/K, SP/KWH (2)
6′8″ frame													
2068	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	2 to 6¼	2 to 6¼	2 to 6¼	2 to 6¼	2 to 6¼	4½ 4¾ 5	3⅜ 4½ 4¾ 5	—
2468													—
2668													—
2668													—
3068													4½ 4¾ 5
3468					—				—		—	—	
3668					—				—		—	—	
3868					—				—		—	—	
4068					—				—		—	—	
7′0″ frame													
2070	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	2 to 6¼	2 to 6¼	2 to 6¼	2 to 6¼	2 to 6¼	—	—	—
2470											—	—	—
2670											—	—	—
2870											—	—	—
3070											—	—	—
3470					—				—		—	—	—
3670					—				—		—	—	—
3870					—				—		—	—	—
4070					—				—		—	—	—
7′2″ frame													
2072	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	4¾ 5¾ 6¾ 8¾	2 to 6¼	2 to 6¼	2 to 6¼	2 to 6¼	2 to 6¼	—	—	—
2472											—	—	—
2672											—	—	—
2672											—	—	—
3072											—	—	—
3472					—				—		—	—	—
3672					—				—		—	—	—
3872					—				—		—	—	—
4072					—				—		—	—	—
transom and sidelight frames													
	Available in four standard jamb depth Series F416 frame only, for all 1¾″ door sizes listed above, both single and pairs of doors. Transom panel either metal panel (furnished) or glass style (glazing beads furnished).												

(1) Frames are available for single doors and pairs of doors of leaf sizes indicated. (2) Available in 2′11″, 3′0″, 3′11″, 4′0″, 4′11″, 5′0″ & 5′11″ widths. SP/KWH Frames identical to SP/K Frames, but 1″ additional jamb opening height eliminates bottom-trimming of wood doors, and hardware is included for pair of sliding doors: hangers with rollers, floor guide, bumper, door pulls and screws. (3) 2″ to 6¼″ wall thicknesses available in ⅛″ increments.

stick systems

Kewanee dealers are equipped to custom-fabricate special entrances, wall openings, transoms, and sidelights to requirements, utilizing Kewanee's stick system components. They are manufactured from 16-ga. cold-rolled steel in popular jamb depths, and prime-painted. Assistance in design, cost estimates and quotations is available at any project stage.



typical stick system elevation

specifications

notes to architect

1. *In general, specify door thickness and skin sheet gauge to fit type of service, frequency of use, label requirements of door and fire-rating of wall. Check UL and local code requirements and hourly ratings for various labels; most require same rating for door label and wall in which located, except 1½-hr. (B) label usually qualifies for use in 2-hr. rated wall, and ¾-hr. (C) label for use in 1-hr. rated wall. For test data on various fire-rated partition systems, see United States Gypsum's Construction Selector SA-100 (Sweet's Architectural File, Sec. 9.5).*

2. *Check label requirements for fire-rated walls, as the number of pairs of doors in one wall may be limited, and hardware requirements vary according to label, use and local code. See applicable data in this catalog.*

3. *Frames should be specified to match doors, or type of service and frequency of use, also label requirements.*

4. *Select and specify proper anchorage from p. 10 for each type of door opening and wall construction.*

5. *For assistance on specific projects contact your Kewanee dealer or the home office at Kewanee, Ill.*

Part 1: general

1.1 scope—Hollow metal doors and steel door frames, as manufactured by Kewanee Manufacturing Division, Kinkead Industries Incorporated.

1.1.1 work included—All material, labor, equipment and transportation necessary to furnish and deliver to the jobsite material as specified in this section.

1.1.2 related work specified elsewhere—Doors and frames in movable partitions; wood and aluminum doors and frames; elevator, vault and revolving doors; toilet compartment doors; structural steel frames; access panels and frames; finish hardware; automatic door openers; glass and glazing; caulking and weatherstripping; field painting.

1.2 qualifications—Hollow metal doors and steel door frames, including appropriate anchorage, shall be fabricated from prime materials in accordance with manufacturer's normal standards and accepted industry practice. Assembly and installation, including field modifications (and custom fabrication), shall be done by a (hollow metal contractor approved by) (authorized dealer of) Kewanee Mfg. Div. of Kinkead Industries Inc.

1.3 shop drawings—All doors, frames and hollow metal work shall be fabricated as shown on the shop drawings, submitted to and approved by the architect before fabrication.

1.4 delivery and storage of materials—Doors and frames shall be delivered to the contractor at the jobsite. They shall be handled so as to avoid damage and stored upright in a protected area on wood skids, covered with tarpaulins or plastic, vented to avoid condensation and entrapped moisture, until ready for installation. Damaged or deteriorated materials shall be removed from the premises,

Part 2: products

2.1 materials

2.1.1 doors—Hollow metal, full flush seamless steel construction, 1¾" thick, completely filled with small cell phenolic resin-impregnated kraft honeycomb core bonded to (20) (18) (16)-ga. skin sheets with heat and pressure-activated adhesive, 14-ga. channel perimeter reinforcement spot-welded to skin sheets top and bottom, continuously welded to vertical channels with welds ground and finished smooth, invisible on exposed surfaces. Top of exterior swing-out doors filled flush with additional channel to prevent moisture accumulation. Lock edge bevel ⅛" in 2".

Hinge and lock reinforcements integral with vertical perimeter channel, additional reinforcing box for lock specified, internal reinforcing for overhead-surface mounted closers, and for surface-mounted hardware as required, for field drilling and tapping by contractor. Hinge mortise drilled and tapped, 3 full threads minimum for standard weight 4½"x 4½" hinges.

Doors to be cleaned, phosphatized and primed with oven-baked enamel of neutral color, ready for finish painting, and shipped in individual cartons. Cartons to be protected from moisture during shipment and handling.

2.1.2 door accessories

a. Louvers—manufacturer's standard sight-proof design, 18-ga. steel, minimum 65% free air area, exterior side nonremovable, interior side moulding loose for screw-attachment.

b. Glazing beads—18-ga. steel, bevel profile with max. 1/16″ projection from door face, neatly coped and mitered at corners, exterior side nonremovable, interior side screw-attached, provided with all glazed styles.

2.1.3 F-Line frames—Prime, cold-rolled steel, (KD for field assembly with minimum 4 interlocking tabs each jamb to secure head) (assembled, arc-welded, ground and finished smooth), mortised, reinforced, drilled and tapped for standard weight, full mortise template hinges and template strike, mortar guards at all hardware preparations. Provide 1 welded-in floor anchor and 3 lock-in anchors each jamb for field insertion, 24″ o.c. max., and furnish with rubber mutes, 3 for single doors, 2 for pairs.

Frames to be cleaned, phosphatized and primed with oven-baked enamel of neutral color, ready for finish painting.

Series (F416) (F418) frames, (16) (18) ga., for 1¾″ doors, hinge reinforcements 7 ga., strike reinforcement 14 ga., prepared for 1½ pr. 4½″x4½″ hinges and ASA 115.1, 4⅞″ strike.

Series F818 frames, 18 ga., for 1⅜″ doors, hinge reinforcements 11 ga., strike reinforcement 14 ga., prepared for 3½″x3½″ hinges, 1 pr. for 6′8″ high, 1½ pr. for 7′0″ or higher doors, and ASA 115.3, 2¾″ strike.

2.1.4 Pan-L-Fit frames—Prime, cold-rolled steel, KD construction and formed with additional return leg for installation into completed drywall partitions; mortised, reinforced, drilled and tapped for standard weight, full mortise template hinges and template strike. Provide countersunk screw hole at bottom of each jamb face for anchorage into rough opening, and patented compression lug assembly to close and lock corner miters. Furnish with rubber mutes, 3 for single doors, 2 for pairs.

Frames to be cleaned, phosphatized and primed with oven-baked enamel of neutral color, ready for finish painting.

Series (PF416)(PF418) frames, (16)(18) ga., for 1¾″ doors, hinge reinforcements 7 ga., strike reinforcement 14 ga., prepared for 1½ pr. 4½″x4½″ hinges and ASA 115.1, 4⅞″ strike.

Series PF818 frames, 18 ga., for 1⅜″ doors, hinge reinforcements 11 ga., strike reinforcement 14 ga., prepared for 3½″x3½″ hinges, 1 pr. for 6′8″ high, 1½ pr. for 7′0″ or higher doors, and ASA 115.3, 2¾″ strike.

2.1.5 SP/Kwik-Fit frames—Prime, .027″ cold-rolled steel, hot-dipped zinc coated requiring no primer, KD construction and formed with additional return leg for installation into completed drywall partitions; punched and embossed for light duty, full mortise template hinges, and provided with 2¼″ full-lip strike adaptable to locksets used. Provide countersunk screw hole at bottom of each jamb face, for anchorage into rough opening, and patented compression lug assembly to close and lock corner miters. Furnish rubber mutes, 3 for single doors, 2 for pairs. Provide tapped hinge anchor plates for metal stud construction (for wood stud construction, anchor with hinge screws through jamb into studs).

2.2 labels—Nonremovable labels, of the hourly rating shown on door schedule, shall be permanently affixed to fire-rated doors and frames, showing compliance with (Underwriters Laboratories) (Factory Mutual) ( ) requirements.

Part 3: execution

3.1 doors—Hang doors level and plumb, shimming as necessary at hardware mortises to provide proper clearances and smooth operation with no binding.

3.2 F-Line frames—Set plumb and square, securely anchor to floor construction and brace for erection of surrounding walls. Apply 1 coat of bituminous paint to frame surfaces to be concealed in masonry walls.

3.3 Pan-L-Fit and SP/Kwik-Fit frames—Install according to manufacturer's directions, after partition is completely erected, for snug fit over partition surfacing. (Provide tapped hinge anchor plates with SP/Kwik-Fit Frames in steel stud partitions.)

3.4 labeled frames—Install labeled frames in accordance with NFPA Publications No. 80 and No. 101, and all applicable codes.

KINKEAD
INDUSTRIES
INCORPORATED · CHICAGO, 60646

Kewanee Metal Doors & Frames
5860 N. Pulaski Rd., Chicago, Ill. 60646
(312) 463-7800

P.O. Box 309 1632 Burlington Ave.
Kewanee, Ill. 61443 (309) 853-4481
Subsidiary of **UNITED STATES GYPSUM Company**

KMD-S-76 Printed in U.S.A.

USG curtain wall systems

SA-805

8.14/Un

exterior walls that offer strength, beauty, economy and versatility

system folder

OHIO EDISON BUILDING, Akron, Ohio
Architects (building): CURTIS, RASMUSSEN & ASSOC.

UNITED STATES GYPSUM
1980—1

8 P

CURTAIN WALL SYSTEM
steel stud & facings

. . . lightweight framing systems for exterior walls (non-load bearing)

description

USG Exterior Curtain Wall systems offer a wide range of effects for non-load bearing exterior walls. Utilizing conventional materials, methods and equipment, plus trades already on the job, these improved systems have been specified in all parts of the nation.

framing systems

USG Steel Studs, C-channel types roll-formed in two styles from five thicknesses of galvanized steel, provide the wall framing with interior drywall, veneer finish and conventional plaster systems. They are an ideal back-up for brick veneer assemblies, reducing dead load 25% in comparison to concrete block backings. Studs are available in nine sizes, five thicknesses, giving a variety of types. The wide choice of stud sizes and spacings accommodates insulation requirements, allows wall heights to 31′3″, wind loads to 40 psf (125 mph), and a variety of building modules.

Studs are anchored at top and bottom in specially designed runners, and THERMAFIBER Insulation is inserted in the cavity.

An alternate framing system uses USG C-H Studs, J-Runners and Gypsum Liner Panels, quickly erected from one side to provide sturdy backup for fire-rated curtain walls. Studs and runners are available in 2½″ and 4″ widths. USG Gypsum Liner Panels have a special fire-resistant core encased in water-resistant paper. Wall heights to 15′3″, wind loads to 40 psf. All components except curtain wall skin may be erected from inside the building.

See U.S.G. folder SA-510 for load-bearing exterior wall framing.

exterior surfaces

Exterior surfaces may be unit masonry, portland cement-lime stucco or various decorative panels or siding materials. Brick or other masonry units are laid with a mortar of portland cement and BONDCRETE Mason's Lime and secured with brick anchors screw-attached through the sheathing to steel studs. This system offers

MONTGOMERY WARD, Mesquite (Dallas) Texas. Architect: OMNIPLAN

Copyright 1980, United States Gypsum Company

speedier building enclosure, the superior protection of a double-cavity wall and greater variety of insulation options.

Portland cement-BONDCRETE Lime stucco is applied in three coats to a 1″ thickness over 3.4-lb. galvanized metal lath. Self-furring metal lath is screw-attached to steel studs through USG Gypsum Sheathing.

Ceramic, aggregated or porcelain-enameled panels, prefinished metal siding and other dry exterior facings weighing up to 8 psf are applied over sheathing and screw-attached to studs.

For the C-H Stud System, curtain wall panels are independently supported by attaching to horizontal girts fastened to the structure.

interior surfaces

Interior surfaces may be gypsum drywall, high-strength veneer finish or conventional plaster. Hundreds of variation in finishes ranging from smooth trowel to oriental-style textures, painted or fabric covered, are available for interior design.

With *gypsum drywall,* where a vapor barrier is required on the warm side, Foil-Back SHEETROCK Brand Gypsum Panels, ½″ or ⅝″ thick, are screw-attached to the steel studs. Foil-Back SHEETROCK Brand FIRECODE Gypsum Panels provide additional resistance to fire exposure, are used in assemblies where a fire rating is required.

Veneer finish interiors that require a vapor barrier on the warm side have Foil-Back IMPERIAL Gypsum Base screw-attached to steel studs. IMPERIAL Finish or DIAMOND Interior Finish is applied 1/16″ to 3/32″ thick over this 4-ft. wide base.

For *conventional plaster* interiors, Foil-Back ROCKLATH Plaster Base is clip or screw-attached to studs and RED TOP Gypsum Plaster is applied ½″ thick over the base.

function and utility

USG Curtain Wall Systems adapt easily to basic design concepts and may be used as vertical spandrels or infill panels and in ledger-supported systems. They are suitable for many types of structures such as office buildings, schools, shopping centers, motels, hotels and apartments.

Design Freedom—Exterior stucco surfaces for this framing offer unlimited opportunity for creative design through the textural expression of smooth monolithic surfaces or random sculptural relief. Color and texture can be varied by the addition of coarse, colored aggregates which contrast boldly with brick, glass and concrete.

Versatility—Interior and exterior facings in various combinations offer the architect and owner a greater selection of surface finishes to meet specific functional and esthetic needs.

Fire resistance—2-hour rating (see table), other ratings also available.

Sound Control—The dampening effect of air space and insulation within the framing reduces the airborne street noise transmitted to the interior.

Thermal Insulation—Easily designed for high thermal performance to meet the "All-Weather Comfort Standard" for heated and air-conditioned buildings. Greater insulation values are attainable in less wall thickness with steel framing than can be attained with block or concrete. For thermal resistance see page 14.

Light Weight—These systems reduce dead load by 25% in brick masonry walls and up to 66% in textured panel assemblies, thus reducing structural foundation requirements.

Weather Resistance—Confirmed by tests, the stucco systems meet air and water infiltration standards set by HUD and NAAMM for 40 psf wind pressure which is equivalent to a wind velocity of 125 mph. Where moisture may penetrate stucco and masonry exteriors, a weather-resistive barrier over edges and joints of gypsum sheathing may be required for protection.

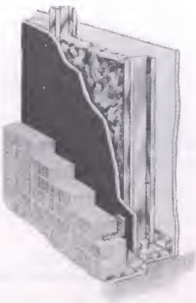
limitations

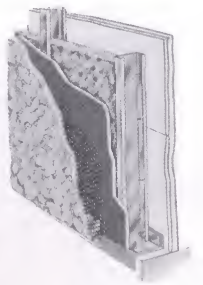
1. Non-load bearing constructions.
2. All details, specifications, and data computations contained in this literature are intended as a general guide for use in USG Curtain Wall Construction. These products must not be used in a design or construction of any structure without complete and detailed evaluation by qualified structural engineers or architects to verify the suitability of these particular products for use in any given structure. Information from this publication should be used only in conjunction with USG Curtain Wall System, as physical properties among competitive products may vary. United States Gypsum Company assumes no liability for failure resulting from use of its drawings, specifications or computations, or for failure resulting from improper application or installation of the Curtain Wall System.

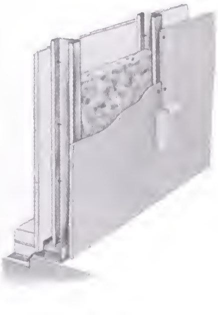
fire rating

description	test no.	fire rating
358ST10 steel studs 16″ o.c.—½″ gypsum sheathing—self-furring metal lath—1″ cement-lime stucco exterior—3″ THERMAFIBER metal stud blankets between studs—⅝″ Foil-Back SHEETROCK brand FIRECODE "C" gypsum panels or IMPERIAL FIRECODE "C" gypsum base and 1/16″ IMPERIAL finish interior	T-4851-OSU	2 hr.
C-H stud system—1″ USG liner panels set between USG steel C-H studs on exterior—2 layers SHEETROCK brand FIRECODE "C" gypsum panels screw attached on interior—joints finished	U of C 4-2-75†	2 hr.

†Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer finish surface.


masonry veneer exterior


stucco exterior

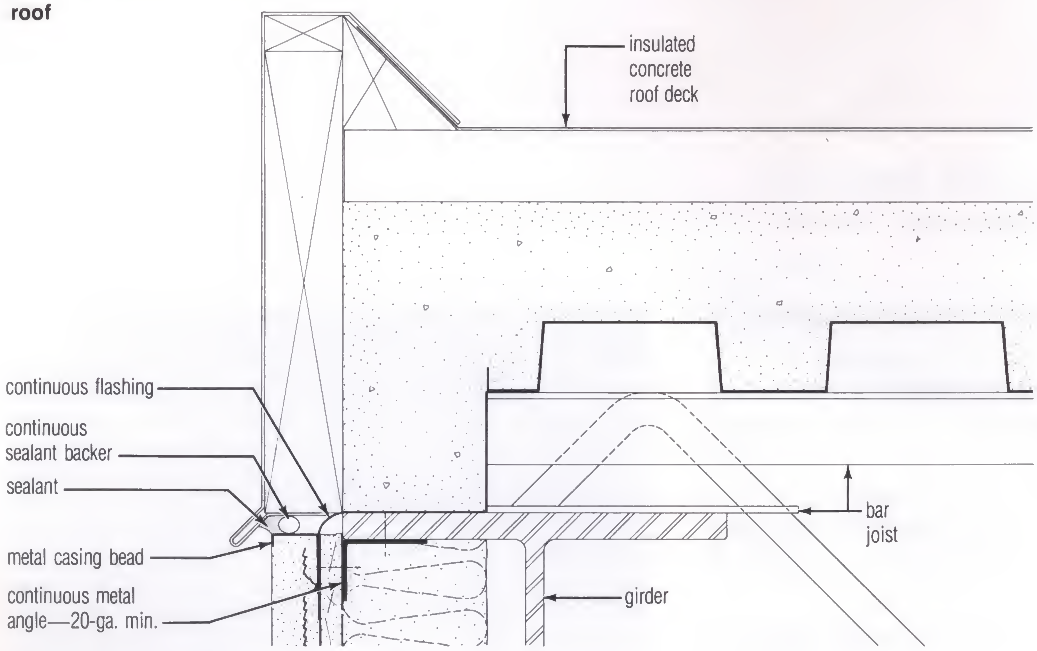

gypsum drywall interior

details

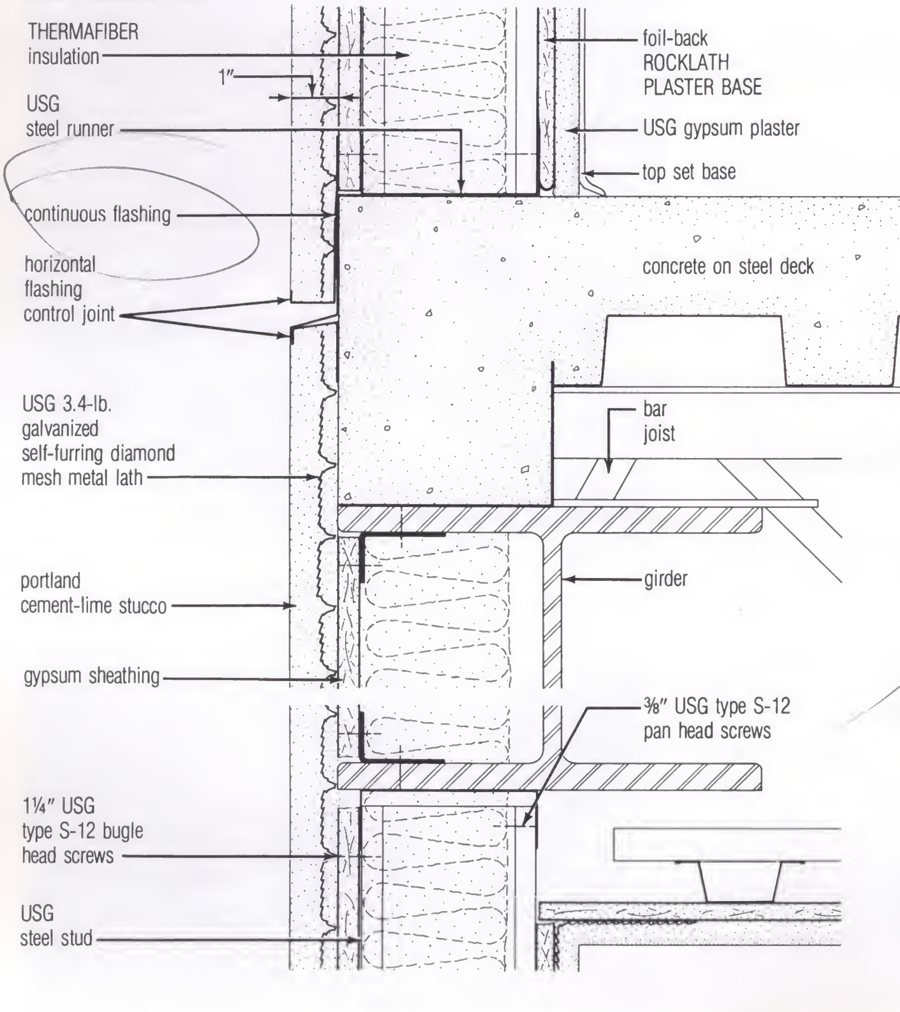
exterior stucco/steel frame

scale: 3″ = 1′-0″

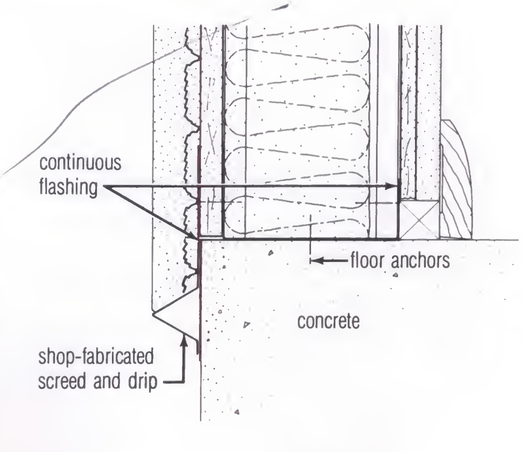
roof


insulated concrete roof deck
continuous flashing
continuous sealant backer
sealant
bar joist
metal casing bead
continuous metal angle—20-ga. min.
girder

intermediate floor


THERMAFIBER insulation
1″
foil-back ROCKLATH PLASTER BASE
USG steel runner
USG gypsum plaster
top set base
continuous flashing
concrete on steel deck
horizontal flashing control joint
bar joist
USG 3.4-lb. galvanized self-furring diamond mesh metal lath
girder
portland cement-lime stucco
gypsum sheathing
⅜″ USG type S-12 pan head screws
1¼″ USG type S-12 bugle head screws
USG steel stud

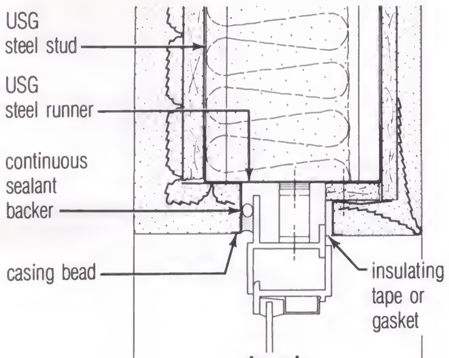
foundation



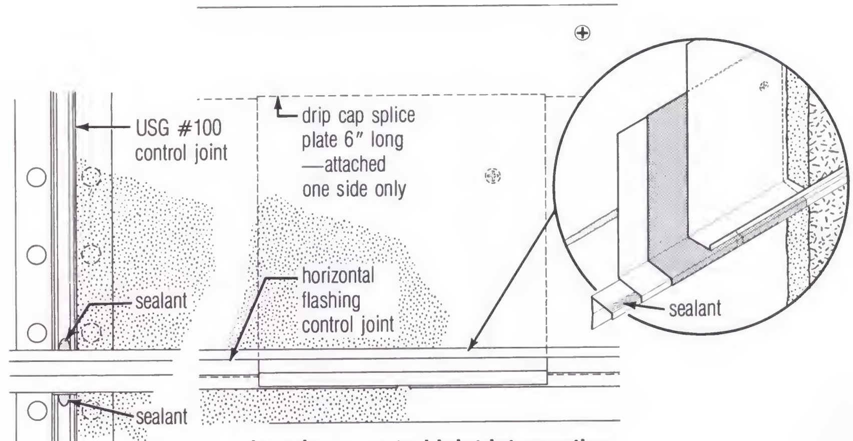
details

scale: 3″ = 1′-0″

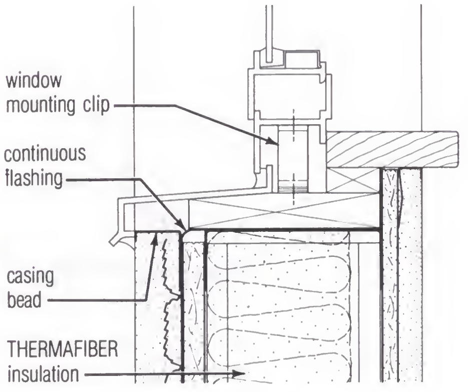
window frame sections



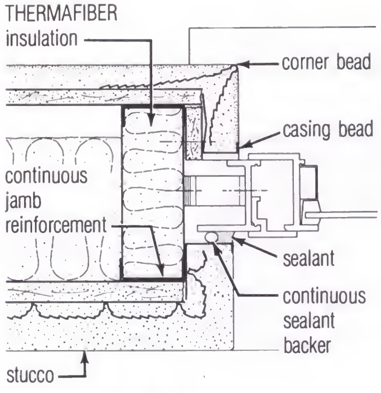
head


USG #100 control joint
drip cap splice plate 6″ long —attached one side only
sealant
horizontal flashing control joint
sealant
sealant

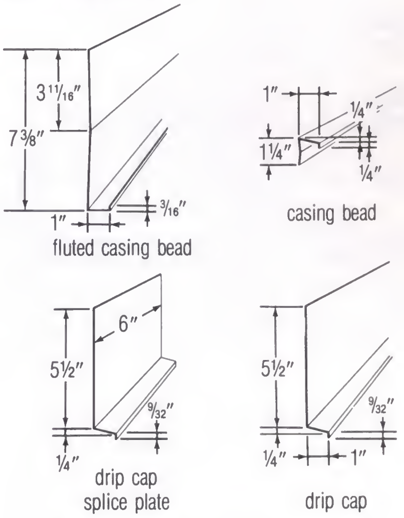
elevation—control joint intersection



sill

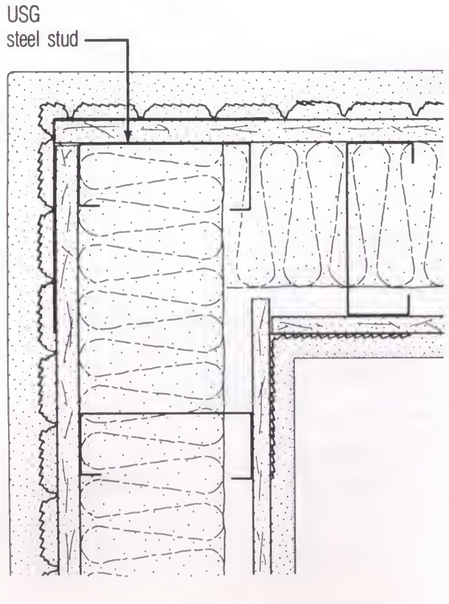


jamb

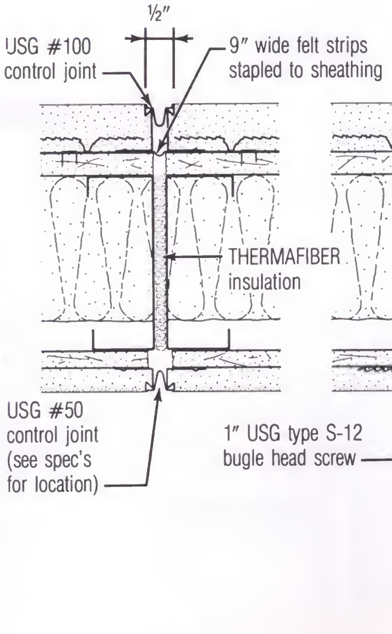


horizontal flashing control joint
24-ga. G-90 hot dipped galv. steel

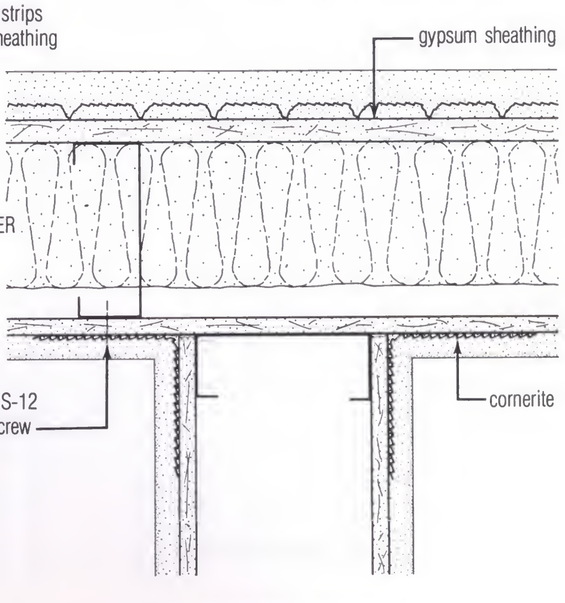
wall plan sections



corner


1/2″
USG #100 control joint
9″ wide felt strips stapled to sheathing
THERMAFIBER insulation
USG #50 control joint (see spec's for location)
1″ USG type S-12 bugle head screw

control joint



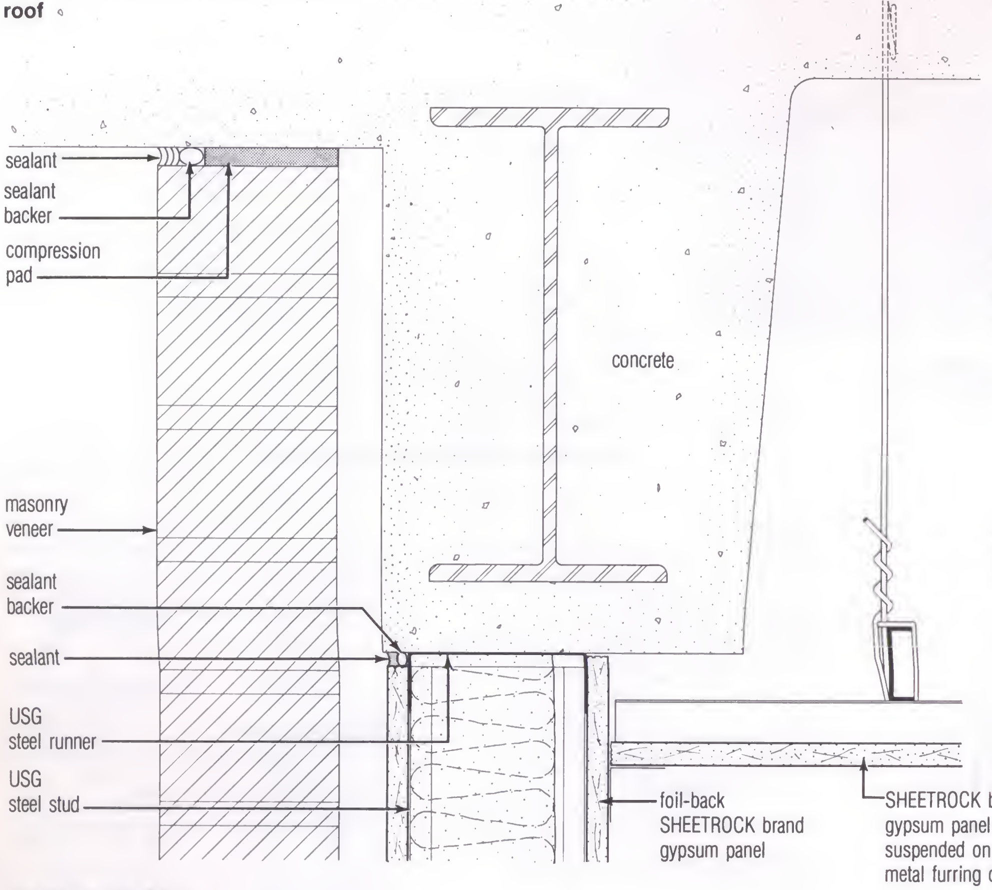
intersecting partition

details

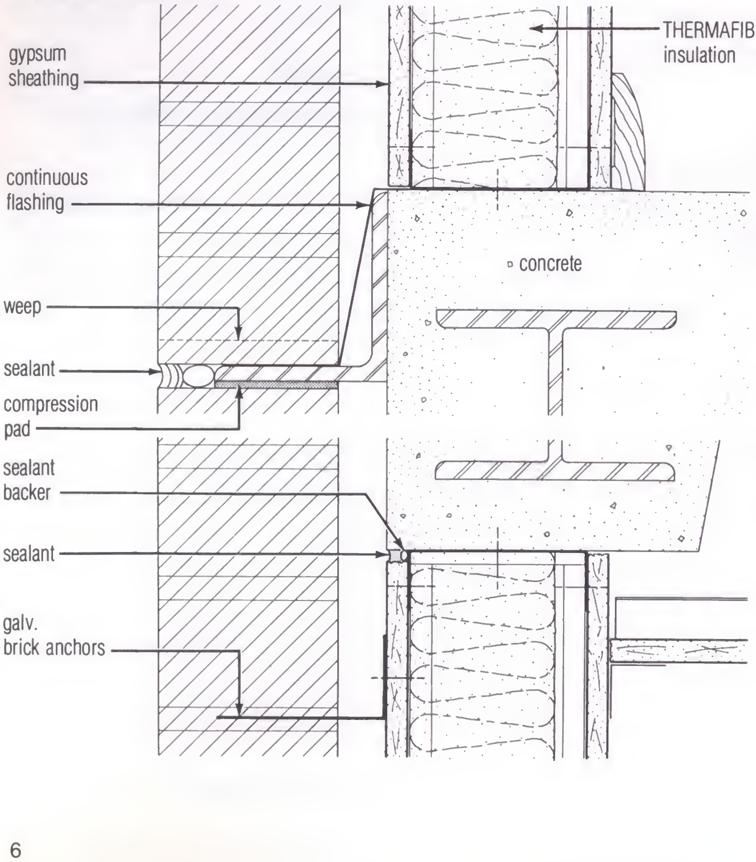
exterior masonry veneer/steel frame

scale: 3″ = 1′-0″

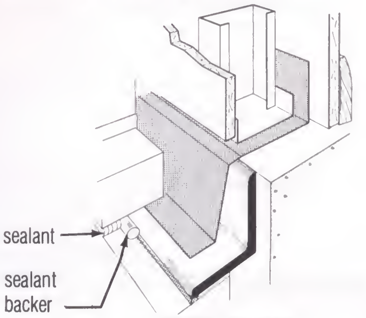
roof


sealant
sealant backer
compression pad
concrete
masonry veneer
sealant backer
sealant
USG steel runner
USG steel stud
foil-back SHEETROCK brand gypsum panel
SHEETROCK brand gypsum panel ceiling suspended on USG metal furring channels

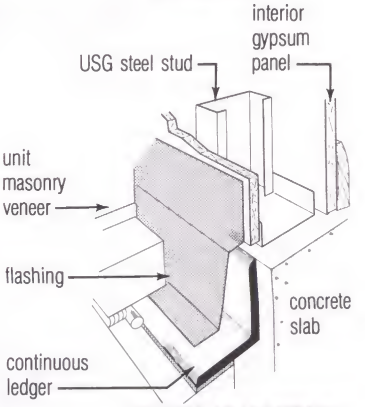
intermediate floor



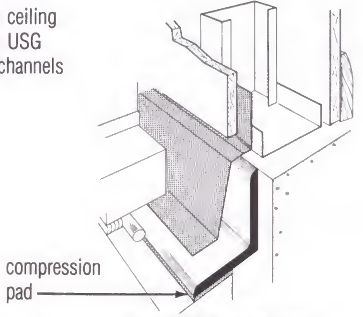
horizontal flashing details



under runner

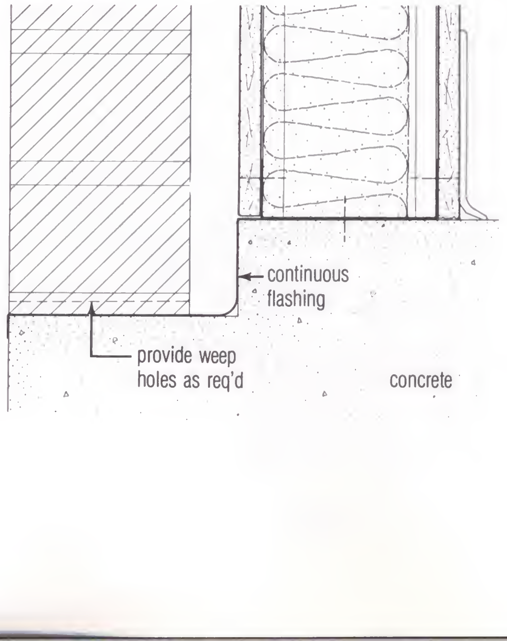


on face of sheathing



behind sheathing

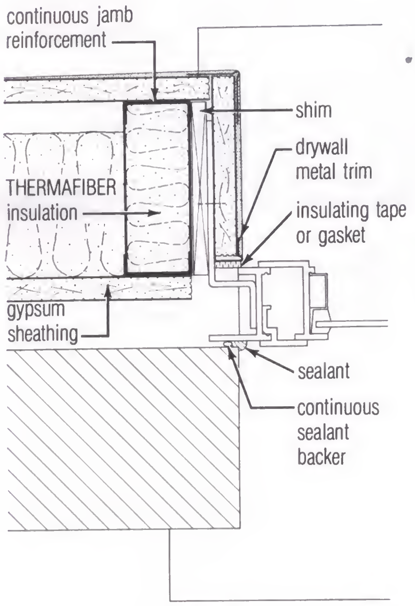
foundation



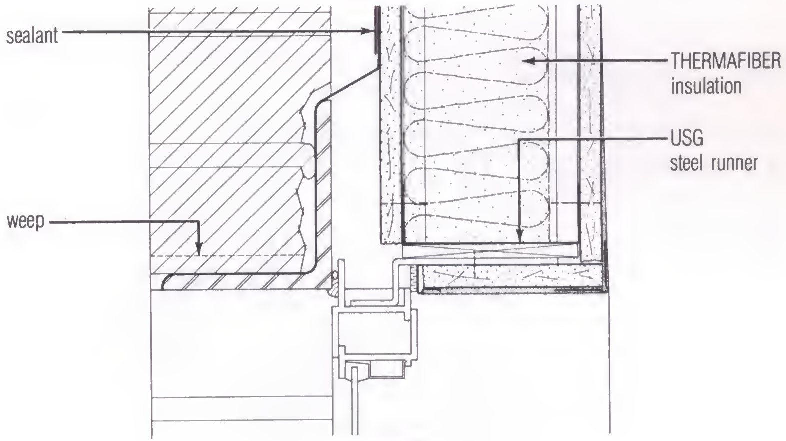
details

scale: 3″ = 1′-0″

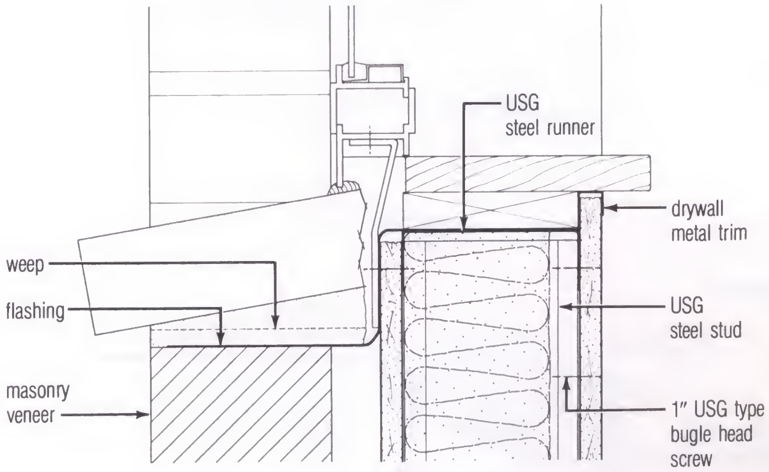
window frame sections


continuous jamb reinforcement
shim
drywall metal trim
insulating tape or gasket
THERMAFIBER insulation
gypsum sheathing
sealant
continuous sealant backer

jamb

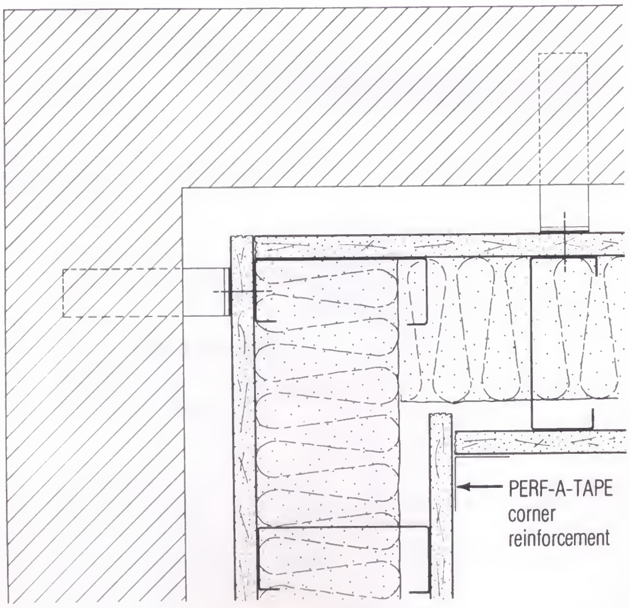


head

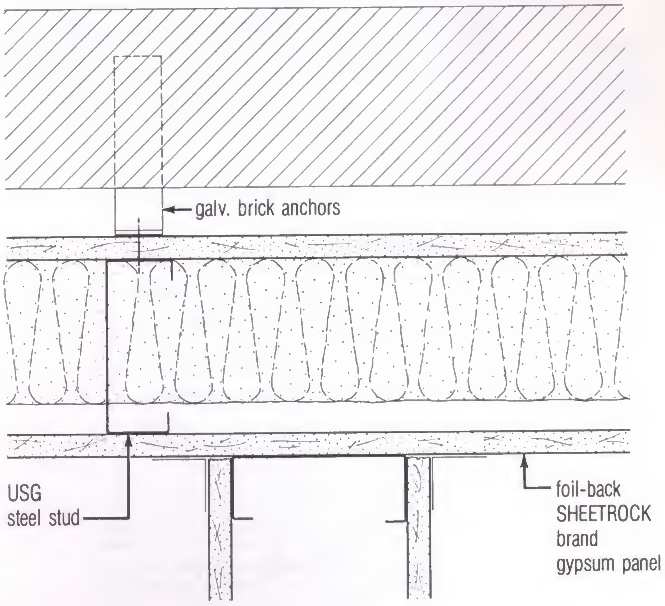


sill

wall plan sections



corner

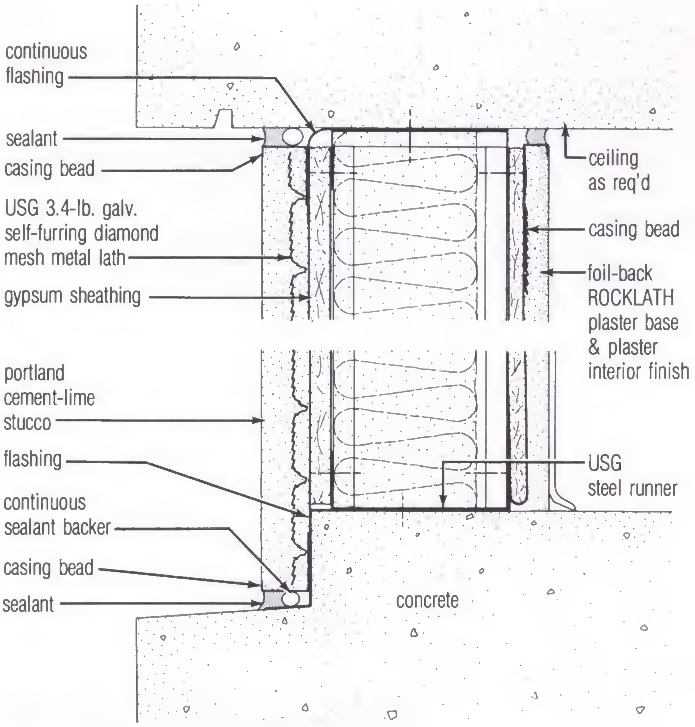


intersecting partition

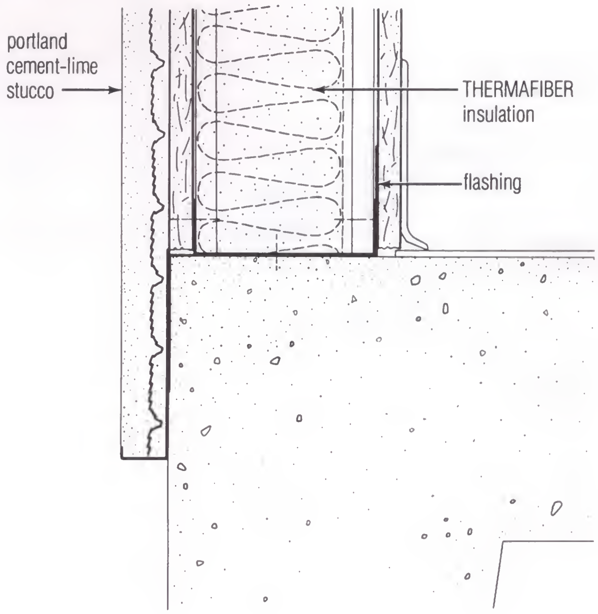
details

exterior stucco/concrete frame

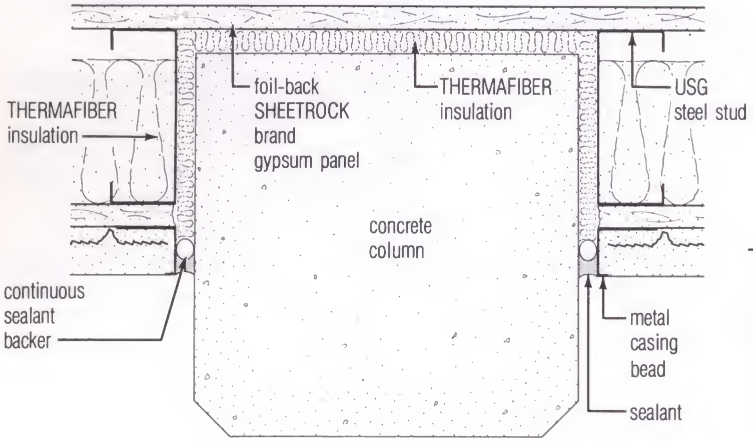
scale: 3″ = 1′-0″


continuous flashing
sealant
casing bead
USG 3.4-lb. galv. self-furring diamond mesh metal lath
gypsum sheathing
portland cement-lime stucco
flashing
continuous sealant backer
casing bead
sealant
ceiling as req'd
casing bead
foil-back ROCKLATH plaster base & plaster interior finish
USG steel runner
concrete

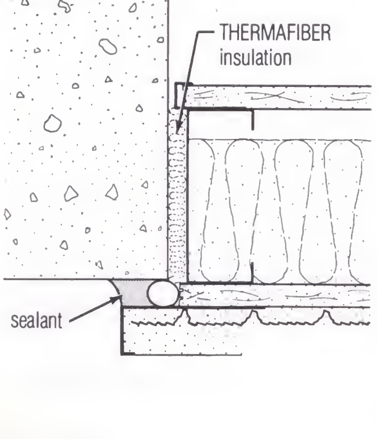
intermediate floor



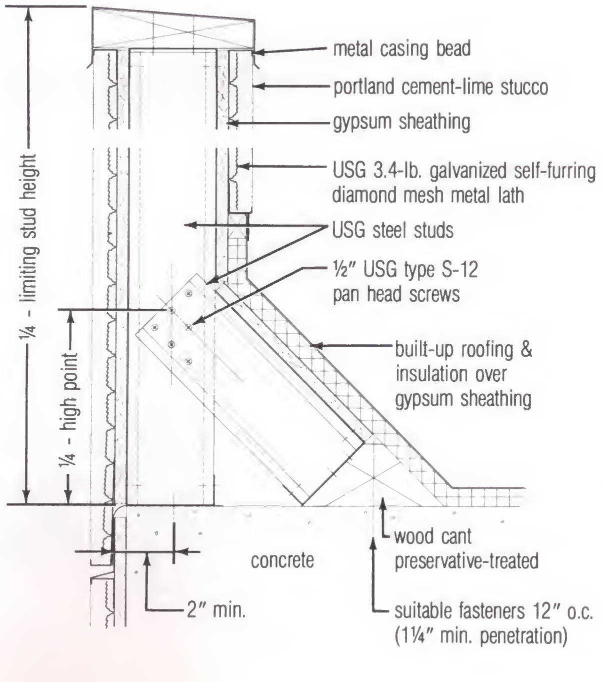
column



column

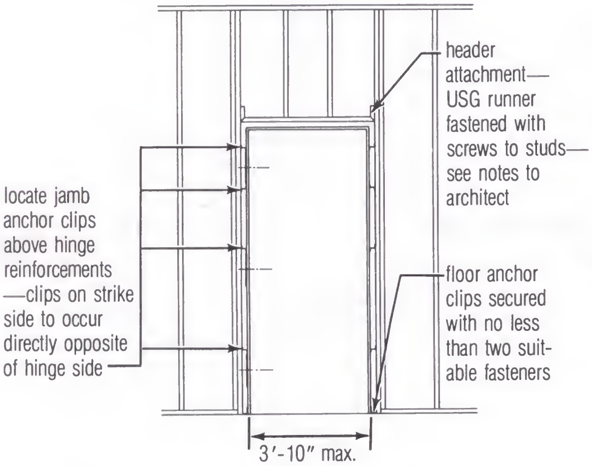


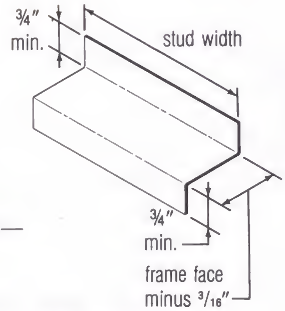
parapet


metal casing bead
portland cement-lime stucco
gypsum sheathing
USG 3.4-lb. galvanized self-furring diamond mesh metal lath
USG steel studs
½″ USG type S-12 pan head screws
built-up roofing & insulation over gypsum sheathing
wood cant preservative-treated
suitable fasteners 12″ o.c. (1¼″ min. penetration)
concrete
2″ min.
¼ - limiting stud height
¼ - high point

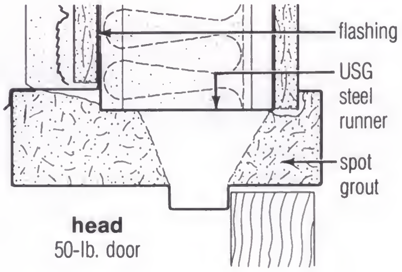
details

wall elevation—50-lb. door max.
USG steel stud system

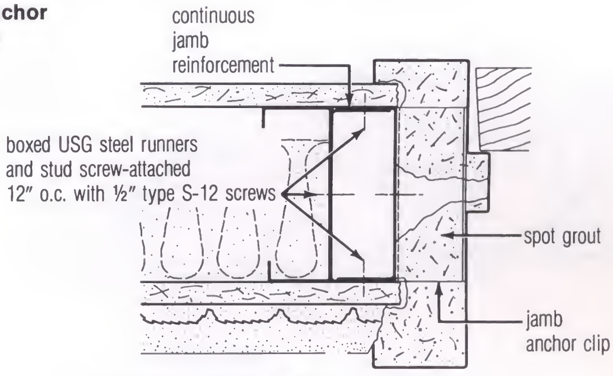

header attachment—USG runner fastened with screws to studs—see notes to architect
locate jamb anchor clips above hinge reinforcements—clips on strike side to occur directly opposite of hinge side
floor anchor clips secured with no less than two suitable fasteners
3′-10″ max.



jamb anchor clip

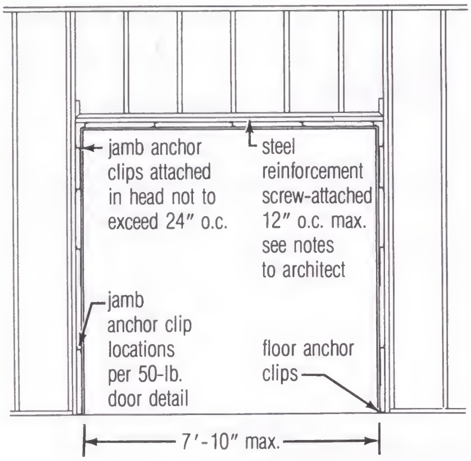


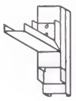
head
50-lb. door


continuous jamb reinforcement
boxed USG steel runners and stud screw-attached 12″ o.c. with ½″ type S-12 screws
spot grout
jamb anchor clip

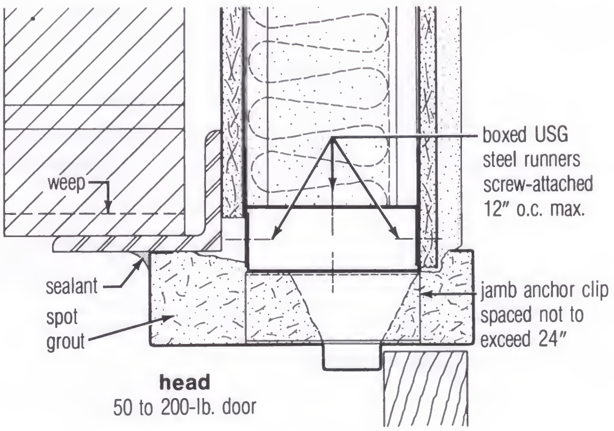
jamb
50-lb. door

wall elevation—200-lb. doors
USG steel stud system


jamb anchor clips attached in head not to exceed 24″ o.c.
steel reinforcement screw-attached 12″ o.c. max. see notes to architect
jamb anchor clip locations per 50-lb. door detail
floor anchor clips
7′-10″ max.

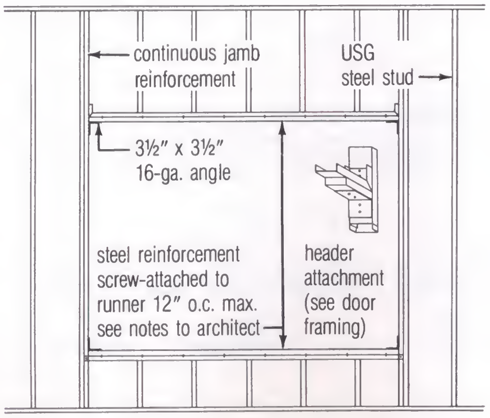


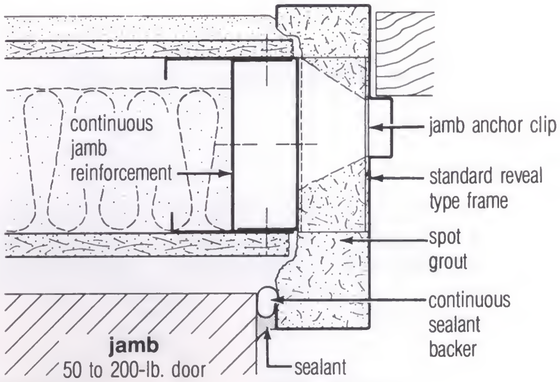
header attachment


weep
boxed USG steel runners screw-attached 12″ o.c. max.
sealant
spot grout
jamb anchor clip spaced not to exceed 24″

head
50 to 200-lb. door

wall elevation—window opening
USG steel stud system

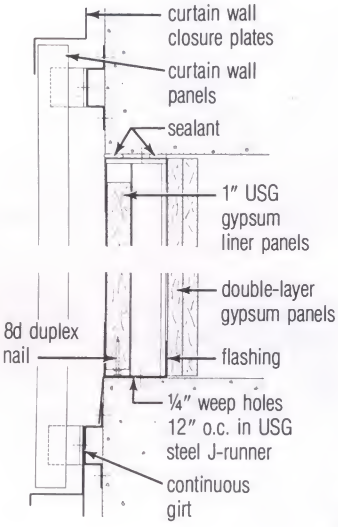

continuous jamb reinforcement
USG steel stud
3½″ x 3½″ 16-ga. angle
steel reinforcement screw-attached to runner 12″ o.c. max. see notes to architect
header attachment (see door framing)

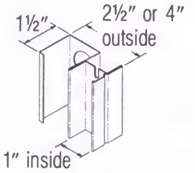

continuous jamb reinforcement
jamb anchor clip
standard reveal type frame
spot grout
continuous sealant backer
sealant

jamb
50 to 200-lb. door

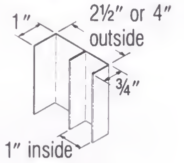
details

C-H stud system

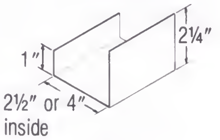

curtain wall closure plates
curtain wall panels
sealant
1" USG gypsum liner panels
double-layer gypsum panels
8d duplex nail
flashing
¼" weep holes 12" o.c. in USG steel J-runner
continuous girt



USG steel C-H stud

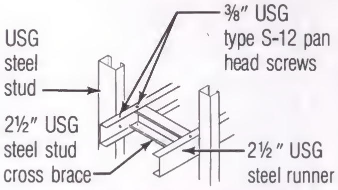


USG steel E-stud

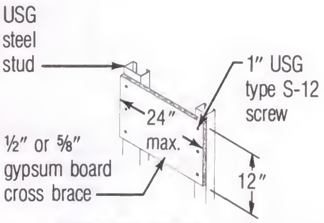


USG steel J-runner

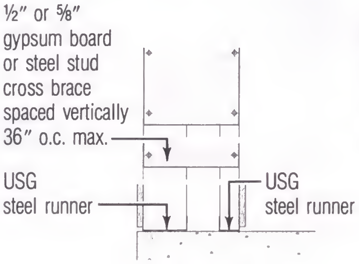
chase & furred walls


⅜" USG type S-12 pan head screws
USG steel stud
2½" USG steel stud cross brace
2½" USG steel runner

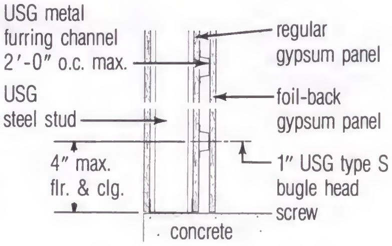
steel stud & runner brace



gypsum brace


½" or ⅝" gypsum board or steel stud cross brace spaced vertically 36" o.c. max.
USG steel runner
USG steel runner

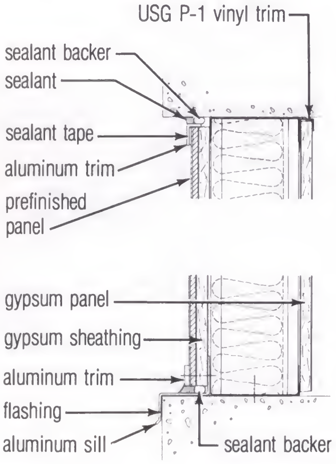
chase wall



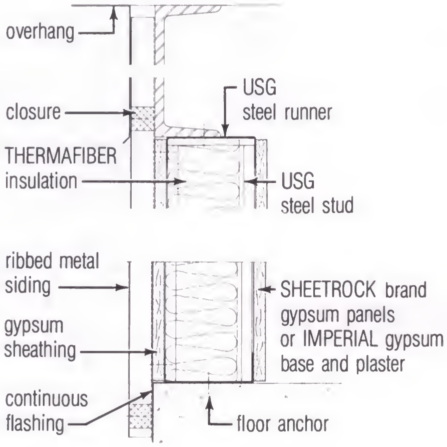
furred wall

optional exterior finishes

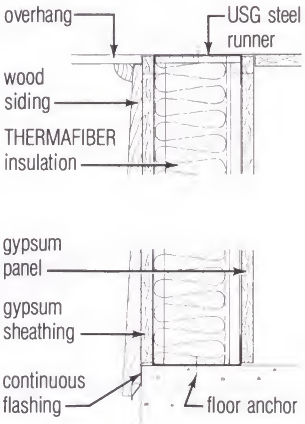
prefinished panel



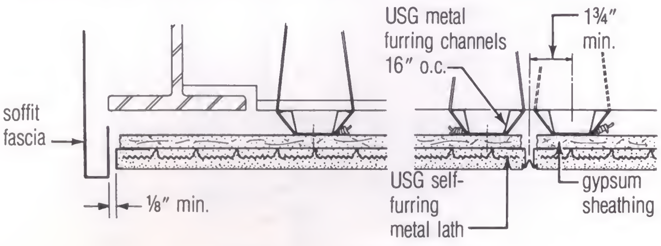
steel panel



wood siding

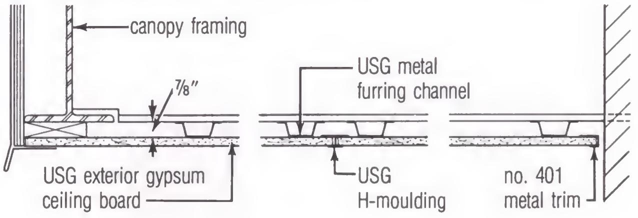


exterior, gypsum sheathing, lath & plaster soffit


soffit fascia
⅛" min.
USG metal furring channels 16" o.c.
1¾" min.
USG self-furring metal lath
gypsum sheathing

perimeter relief **control joint**

exterior gypsum ceiling board soffit



exterior curtain wall stud—ST style

limiting heights with interior and exterior facing (1)

design criteria		limiting heights for USG steel stud-section designations							
		stucco exterior				brick veneer exterior			
wind load (psf)	stud spacing (in o.c.)	2½″ 212ST10	3⅝″ 358ST10	4″ 40ST10	6″ 60ST10	2½″ 212ST10	3⅝″ 358ST10	4″ 40ST10	6″ 60ST10
15	12	12′9″	15′9″	16′9″	21′9″	12′3″	14′0″	14′9″	17′6″
(80	16	11′9″	15′0″	16′0″	20′9″	11′9″	13′6″	14′0″	16′6″
mph)	24	9′9″	12′3″	13′3″	17′6″	9′9″	11′9″	12′3″	14′6″
20	12	11′6″	14′3″	15′3″	19′9″	11′0″	12′9″	13′3″	15′9″
(90	16	10′3″	13′0″	14′0″	18′6″	10′3″	12′3″	12′9″	15′0″
mph)	24	8′6″	10′9″	11′6″	15′0″	8′6″	10′9″	11′0″	13′3″
25	12	10′6″	13′3″	14′0″	18′6″	10′3″	11′9″	12′6″	14′9″
(100	16	9′3″	11′9″	12′6″	16′6″	9′3″	11′3″	11′9″	14′0″
mph)	24	7′6″	9′6″	10′3″	12′0″	7′6″	9′6″	10′3″	12′0″
30	12	9′9″	12′3″	13′3″	17′3″	9′9″	11′3″	11′9″	13′9″
(110	16	8′6″	10′9″	11′6″	15′0″	8′6″	10′9″	11′0″	
mph)	24	6′9″	8′9″	9′3″	10′0″	6′9″	8′6″	9′3″	10′0″
35	12	9′0″	11′6″	12′3″	16′3″	9′0″	10′6″	11′0″	13′0″
(120	16	7′9″	10′0″	10′6″	12′9″	7′9″	10′0″	10′6″	12′6″
mph)	24	6′3″	8′0″	8′6″	8′6″	6′3″	8′0″	8′6″	8′6″
40	12	8′6″	10′9″	11′6″	15′0″	8′6″	10′0″	10′6″	12′6″
(125	16	7′3″	9′3″	10′0″	11′3″	7′3″	9′3″	10′0″	11′3″
mph)	24	6′0″	7′6″	7′6″	7′6″	6′0″	7′6″	7′6″	7′6″

(1) Drywall or plaster interior, stucco or brick veneer exterior. Stress based on capacity of studs alone; bending stress: 26,600 psi (33% increase for wind load). For stucco exterior, deflection L/360 based on composite wall assembly. For brick veneer exterior, deflection L/600 based on composite wall assembly with noncomposite addition of brick veneer stiffness.

exterior curtain wall stud—C-H style

limiting heights with interior and exterior facing (1)

design criteria			limiting heights for USG steel stud-section designations	
wind load	defl. limit	stud spacing (in o.c.)	2½″ CH8	4″ CH10
15	L/240	12	11′9″	15′3″
psf		24	10′3″	12′6″
(80	L/360	12	10′3″	13′6″
mph)		24	9′10″	11′0″
20	L/240	12	10′6″	14′0″
psf		24	9′0″	11′6″
(90	L/360	12	9′3″	12′3
mph)		24	8′3″	10′0″
25	L/240	12	9′9″	13′0″
psf		24	8′0″	10′6″
(100	L/360	12	8′6″	11′3″
mph)		24	—	9′3″
30	L/240	12	9′3″	12′3″
psf		24	—	9′6″
(110	L/360	12	8′0″	10′6″
mph)		24	—	8′9″
35	L/240	12	8′9″	11′6″
psf		24	—	8′0″
(120	L/360	24	—	10′0″
mph)		24	—	8′0″
40	L/240	12	8′6″	11′0″
psf		24	—	—
(125	L/360	12	—	9′9″
mph)		24	—	—

(1) Any independently supported exterior treatment; interior is two layers of ½″ SHEETROCK Brand Gypsum Panels. Stress based on capacity of studs alone. Deflection based on composite wall assembly without exterior finish.

runner attachment spacing

curtain wall limiting heights

light—using power-driven fastener with capacity of 193-lb. single shear and 200-lb. bearing force, driven into CR8 runner.

	runner attachment spacing (in. o.c.)				
	24	20	16	12	8
wind load (psf)	limiting heights for curtain wall				
15	12′10″	15′5″	19′3″	25′9″	38′6″
20	9′8″	11′7″	14′6″	19′3″	29′0″
25	7′9″	9′3″	11′7″	15′5″	23′2″
30	—	7′9″	9′8″	12′10″	19′3″
35	—	—	8′3″	11′0″	16′6″
40	—	—	7′3″	9′8″	14′6″

medium—using power-driven fastener with capacity of 300-lb. single shear and 300-lb. bearing force, driven into CR10 runner.

	runner attachment spacing (in o.c.)				
	24	20	16	12	8
wind load (psf)	limiting heights for curtain wall				
15	20′0″	24′0″	30′0″	40′0″	60′0″
20	15′0″	18′0″	22′6″	30′0″	45′0″
25	12′0″	14′5″	18′0″	24′0″	36′0″
30	10′0″	12′0″	15′0″	20′0″	30′0″
35	8′7″	10′3″	12′10″	17′2″	25′8″
40	7′6″	9′0″	11′3″	15′0″	22′6″

heavy—using power-driven fastener with capacity of 400-lb. single shear and 400-lb. bearing force, driven into CR13 runner.

	runner attachment spacing				
	24	20	16	12	8
wind load (psf)	limiting heights for curtain wall				
15	26′8″	32′0″	40′0″	53′4″	80′0″
20	20′0″	24′0″	30′0″	40′0″	60′0″
25	16′0″	19′2″	24′0″	32′0″	48′0″
30	13′4″	16′0″	20′0″	26′8″	40′0″
35	11′5″	13′9″	17′2″	22′10″	34′3″
40	10′0″	12′0″	15′0″	20′0″	30′0″

exterior curtain wall stud—SJ style

limiting heights with gypsum sheathing exterior and drywall or plaster interior

design criteria		stud spacing (in o.c).	limiting heights (1) for USG steel stud-section designations																
wind load	deflection limitation		3½″					4″				5½″				6″			7½″		
			35SJ8	35SJ10	35SJ13	35SJ16	35SJ20	40SJ10	40SJ13	40SJ16	40SJ20	55SJ10	55SJ13	55SJ16	55SJ20	60SJ13	60SJ16	60SJ20	75SJ13	75SJ16	75SJ20
15 psf (80 mph)	L/240	12	13′3″	14′0″	15′0″	16′0″	17′0″	15′3″	16′6″	17′9″	19′0″	19′6″	21′0″	22′9″	24′3″	22′6″	24′6″	26′0″	26′9″	29′3″	31′3″
		16	12′3″	12′9″	13′9″	14′9″	15′9″	14′3″	15′3″	16′6″	17′6″	18′0″	19′3″	21′0″	22′3″	20′9″	22′6″	24′0″	24′9″	26′9″	28′6″
		24	10′9″	11′3″	12′0″	13′0″	13′9″	12′6″	13′3″	14′3″	15′3″	15′9″	17′0″	18′3″	19′6″	18′0″	19′6″	20′9″	21′6″	23′6″	25′0″
	L/360	12	11′6″	12′0″	13′0″	14′0″	15′0″	13′6″	14′6″	15′6″	16′6″	17′0″	18′6″	20′0″	21′3″	19′9″	21′6″	22′9″	23′6″	25′6″	27′3″
		16	10′9″	11′3″	12′0″	13′0″	13′9″	12′6″	13′3″	14′3″	15′3″	15′9″	17′0″	18′3″	19′6″	18′0″	19′6″	20′9″	21′6″	23′6″	25′0″
		24	9′3″	9′9″	10′6″	11′3″	12′0″	10′9″	11′6″	12′6″	13′3″	13′9″	14′9″	16′0″	17′0″	15′9″	17′3″	18′3″	18′9″	20′6″	21′9″
20 psf (90 mph)	L/240	12	12′0″	12′6″	13′6″	14′6″	15′6″	14′0″	15′0″	16′3″	17′3″	17′9″	19′0″	20′9″	22′3″	20′6″	22′3″	23′9″	24′3″	26′6″	28′3″
		16	11′0″	11′9″	12′6″	13′6″	14′3″	13′0″	13′9″	15′0″	15′9″	16′3″	17′6″	19′0″	20′3″	18′9″	20′6″	21′9″	22′6″	24′3″	26′0″
		24	9′9″	10′3″	11′0″	11′9″	12′6″	11′3″	12′0″	13′0″	13′9″	14′3″	15′3″	16′9″	17′9″	16′6″	17′9″	19′0″	19′6″	21′3″	22′9″
	L/360	12	10′6″	11′0″	11′9″	12′9″	13′6″	12′3″	13′0″	14′3″	15′0″	15′6″	16′9″	18′3″	19′3″	17′9″	19′6″	20′9″	21′3″	22′3″	24′9″
		16	9′9″	10′3″	11′0″	11′9″	12′6″	11′3″	12′0″	13′0″	13′9″	14′3″	15′3″	16′9″	17′9″	16′6″	17′9″	19′0″	19′6″	21′3″	22′9″
		24	8′6″	9′0″	9′6″	10′3″	10′9″	9′9″	10′6″	11′3″	12′0″	12′6″	13′6″	14′6″	15′6″	14′3″	15′6″	16′6″	17′0″	18′6″	19′9″
25 psf (100 mph)	L/240	12	11′0″	11′9″	12′6″	13′6″	14′6″	13′0″	14′0″	15′0″	16′0″	16′6″	17′9″	19′3″	20′6″	19′0″	20′9″	22′0″	22′9″	24′9″	26′3″
		16	10′3″	10′9″	11′6″	12′6″	13′3″	12′0″	12′9″	13′9″	14′9″	15′3″	16′3″	17′9″	18′9″	17′6″	19′0″	20′3″	20′9″	22′6″	24′0″
		24	8′9″	9′6″	10′0″	11′0″	11′6″	10′6″	11′3″	12′0″	12′9″	12′0″	14′3″	15′6″	16′6″	15′3″	16′6″	17′6″	16′0″	19′9″	21′0″
	L/360	12	9′9″	10′3″	11′0″	11′9″	12′6″	11′3″	12′3″	13′3″	14′0″	14′6″	15′6″	16′9″	18′0″	16′6″	18′0″	19′3″	19′9″	21′6″	23′0″
		16	9′0″	9′6″	10′0″	11′0″	11′6″	10′6″	11′3″	12′0″	12′9″	13′3″	14′3″	15′6″	16′6″	15′3″	16′6″	17′6″	18′3″	19′9″	21′0″
		24	7′9″	8′3″	8′9″	9′6″	10′0″	9′0″	9′′9″	10′6″	11′3″	11′6″	12′6″	13′6″	14′3″	13′3″	14′6″	15′6″	15′9″	17′3″	18′6″
30 psf (110 mph)	L/240	12	10′6″	11′0″	11′9″	12′9″	13′6″	12′3″	13′0″	14′3″	15′0″	15′6″	16′9″	18′3″	19′3″	17′9″	19′6″	20′9″	21′3″	23′3″	24′9″
		16	9′9″	10′3″	11′0″	11′9″	12′6″	11′3″	12′0″	13′0″	13′9″	14′3″	15′3″	16′9″	17′9″	16′6″	17′9″	19′0″	19′6″	21′3″	22′9″
		24	8′0″	9′0″	9′6″	10′3″	10′9″	9′9″	10′6″	11′3″	12′0″	10′0″	13′3″	14′6″	15′6″	13′3″	15′6″	16′6″	13′3″	16′9″	19′9″
	L/360	12	9′0″	9′6″	10′3″	11′3″	11′9″	10′9″	11′6″	12′3″	13′3″	13′6″	14′6″	15′9″	17′0″	15′6″	17′0″	18′0″	18′6″	20′3″	21′9″
		16	8′6″	9′0″	9′6″	10′3″	10′9″	9′9″	10′6″	11′3″	12′0″	12′6″	13′6″	14′6″	15′6″	14′3″	15′6″	16′6″	17′0″	18′6″	19′9″
		24	7′6″	7′9″	8″3	9′0″	9′6″	8′6″	9′3″	10′0″	10′6″	10′0″	11′9″	12′9″	13′6″	12′6″	13′6″	14′6″	13′3″	16′3″	17′3″
35 psf (120 mph)	L/240	12	10′0″	10′6″	11′3″	12′0″	12′9″	11′6″	12′6″	13′6″	14′3″	14′9″	15′9″	17′3″	18′3″	17′0″	18′6″	19′9″	20′3″	22′0″	23′6″
		16	9′0″	9′9″	10′3″	11′3″	11′9″	10′9″	11′6″	12′3″	13′0″	12′9″	14′6″	15′9″	16′9″	15′6″	17′0″	18′0″	17′3″	20′3″	21′6″
		24	7′3″	8′3″	9′0″	9′9″	10′3″	8′6″	10′0″	10′9″	11′6″	8′6″	11′6″	13′9″	14′9″	11′6″	14′3″	15′9″	11′6″	14′3″	17′9″
	L/360	12	8′9″	9′3″	9′9″	10′6″	11′3″	10′0″	10′9″	11′9″	12′6″	12′9″	13′9″	15′0″	16′0″	14′9″	16′3″	17′3″	17′9″	19′3″	20′6″
		16	8′0″	8′6″	9′0″	9′9″	10′3″	9′3″	10′0″	10′9″	11′6″	11′9″	12′9″	13′9″	14′9″	13′9″	14′9″	15′9″	16′3″	17′9″	18′9″
		24	7′0″	7′6″	8′0″	8′6″	9′0″	8′3″	8′9″	9′6″	10′0″	8′6″	11′3″	12′0″	12′9″	11′6″	13′0″	13′9″	11′6″	14′3″	16′6″
40 psf (125 mph)	L240	12	9′6″	10′0″	10′9″	11′6″	12′3″	11′0″	12′0″	12′9″	13′9″	14′0″	15′3″	16′6″	17′6″	16′3″	17′9″	18′9″	19′3″	21′0″	22′6″
		16	8′6″	9′3″	10′0″	10′9″	11′3″	10′3″	11′0″	11′9″	12′6″	11′3″	14′0″	15′0″	16′0″	15′0″	16′3″	17′3″	15′0″	18′9″	20′6″
		24	6′3″	7′6″	8′9″	9′3″	9′9″	7′6″	9′6″	10′3″	11′0″	7′6″	10′0″	12′6″	14′0″	10′0″	12′6″	15′0″	10′0″	12′5″	15′9″
	L/360	12	8′3″	8′9″	9′6″	10′3″	10′9″	9′9″	10′6″	11′3″	12′0″	12′3″	13′3″	14′6″	15′3″	14′3″	15′6″	16′6″	17′0″	18′6″	19′9″
		16	7′9″	8′0″	8′9″	9′3″	9′9″	9′0″	9′6″	10′3″	11′0″	11′3″	12′3″	13′3″	14′0″	13′0″	14′3″	15′0″	15′0″	17′0″	18′0″
		24	6′3″	7′0″	7′6″	8′3″	8′6″	7′6″	8′3″	9′0″	9′6″	7′6″	10′0″	11′6″	12′3″	10′0″	12′3″	13′3″	10′0″	12′6″	15′9″

(1) Exterior is USG Triple-Sealed Gypsum Sheathing, 0.4″ thick or ½″ USG Gypsum Sheathing. Stress based on capacity of studs alone; bending stress: 26,660 psi (33% increase for wind load). Deflection based on composite wall assembly.

exterior curtain wall stud—SJ style

limiting heights with stucco exterior and drywall or plaster interior

wind load (psf)	stud spacing (in o.c.)	limiting heights (1) for USG stud-section designations																
		3½″					4″				5½″				6″			7½″		
		35SJ8	35SJ10	35SJ13	35SJ16	35SJ20	40SJ10	40SJ13	35SJ16	35SJ20	55SJ10	55SJ13	55SJ16	55SJ20	60SJ13	60SJ16	60SJ20	75SJ13	75SJ16	75SJ20
15 (80 mph)	12	15′0″	15′9″	16′6″	17′6″	18′0″	17′0″	18′0″	19′0″	19′9″	21′0″	22′0″	23′6″	24′6″	23′6″	24′9″	26′0″	27′6″	29′3″	30′6″
	16	14′0″	15′0″	15′9″	16′6″	17′0″	16′3″	17′0″	18′0″	18′6″	19′9″	21′0″	22′0″	23′0″	22′3″	23′6″	24′6″	25′9″	27′6″	28′9″
	24	11′3″	12′9″	13′9″	14′6″	15′0″	14′0″	15′0″	15′9″	16′3″	17′3″	18′3″	19′3″	20′0″	19′3″	20′6″	21′3″	22′6″	24′0″	25′0″
20 (90 mph)	12	13′9″	14′3″	15′0″	15′9″	16′6″	15′6″	16′3″	17′3″	18′0″	19′0″	20′0″	21′3″	22′3″	21′3″	22′6″	23′9″	25′0″	26′6″	27′9″
	16	12′0″	13′6″	14′3″	15′0″	15′6″	14′9″	15′6″	16′3″	17′0″	18′0″	19′0″	20′0″	21′0″	20′3″	21′3″	22′3″	23′6″	25′0″	26′0″
	24	9′9″	11′0″	12′6″	13′0″	13′6″	12′0″	13′6″	14′3″	14′9″	15′0″	16′6″	17′6″	18′3″	17′6″	18′6″	19′6″	20′0″	21′9″	22′9″
25 (100 mph)	12	12′6″	13′3″	14′0″	14′9″	15′3″	14′3″	15′3″	16′0″	16′9″	17′9″	18′9″	19′9″	20′9″	19′0″	21′0″	22′0″	23′3″	24′6″	25′9″
	16	10′9″	12′0″	13′3″	14′0″	14′6″	13′3″	14′3″	15′0″	15′9″	16′6″	17′6″	18′6″	19′6″	18′9″	19′9″	20′9″	21′9″	23′0″	24′3″
	24	8′9″	10′0″	11′6″	12′3″	12′6″	10′9″	12′6″	13′3″	13′9″	12′0″	15′6″	16′3″	17′0″	16′0″	17′3″	18′0″	16′0″	20′0″	21′3″
30 (110 mph)	12	11′3″	12′6″	13′0″	13′9″	14′3″	13′6″	14′3″	15′0″	15′9″	16′6″	17′6″	18′6″	19′6″	18′6″	19′9″	20′9″	21′9″	23′3″	24′3″
	16	9′9″	11′0″	12′6″	13′0″	13′6″	12′0″	13′6″	14′3″	14′9″	15′0″	16′6″	17′6″	18′3″	17′6″	18′6″	19′6″	20′0″	21′9″	22′9″
	24	8′0″	9′0″	10′6″	11′6″	11′9″	10′0″	11′6″	12′6″	13′0″	10′0″	13′3″	15′3″	16′0″	13′3″	16′3″	17′0″	13′3″	16′9″	20′0″
35 (120 mph)	12	10′6″	11′9″	12′6″	13′0″	13′9″	12′9″	13′6″	14′3″	14′9″	15′9″	16′9″	17′9″	18′6″	17′9″	18′9″	19′9″	20′9″	22′0″	23′0″
	16	9′0″	10′3″	11′9″	12′6″	13′0″	11′3″	12′9″	13′6″	14′0″	12′9″	15′9″	16′9″	17′3″	16′9″	17′9″	18′6″	17′3″	20′9″	21′6″
	24	7′3″	8′3″	9′9″	10′9″	11′3″	8′6″	10′6″	11′9″	12′3″	8′6″	11′6″	14′3″	15′3″	11′6″	14′3″	16′0″	11′6″	14′3″	17′9″
40 (125 mph)	12	9′9″	11′0″	12′0″	12′6″	13′0″	12′0″	13′0″	13′9″	14′3″	15′0″	16′0″	17′0″	17′9″	17′0″	18′0″	18′9″	19′9″	21′0″	22′0″
	16	8′6″	9′6″	11′0″	12′0″	12′3″	10′6″	12′0″	13′0″	13′6″	11′3″	15′0″	16′0″	16′6″	15′0″	17″0″	17′9″	15′0″	18′9″	20′9″
	24	6′3″	7′6″	9′0″	10′3″	10′9″	7′6″	9′9″	11′3″	11′9″	7′6″	10′0″	12′6″	14′6″	10′0″	12′6″	15′6″	10′0″	12′6″	15′9″

(1) Stress based on capacity of studs alone; bending stress: 26,660 psi (33% increase for wind load). Deflection L/360 based on composite assembly.

USG curtain wall systems

limiting heights with brick veneer exterior and drywall or plaster interior

wind load (psf)	stud spacing (in o.c.)	limiting heights (1) for USG stud-section designations																
		3½″					4″				5½″				6″			7½″		
		35SJ8	35SJ10	35SJ13	35SJ16	35SJ20	40SJ10	40SJ13	40SJ16	40SJ20	55SJ10	55SJ13	55SJ16	55SJ20	60SJ13	60SJ16	60SJ20	75SJ13	75SJ16	75SJ20
15 (80 mph)	12	13′9″	14′0″	14′9″	15′3″	15′9″	15′0″	15′6″	16′5″	16′9″	17′0″	17′9″	18′9″	19′9″	18′9″	19′9″	20′9″	21′3″	22′9″	24′0″
	16	13′3″	13′6″	14′0″	14′9″	15′3″	14′3″	15′0″	15′6″	16′0″	16′3″	17′0″	17′9″	18′6″	17′9″	18′6″	19′6″	20′0″	21′3″	22′3″
	24	11′3″	11′9″	12′3″	12′9″	13′3″	12′6″	13′0″	13′6″	14′0″	14′3″	14′9″	15′6″	16′3″	15′6″	16′3″	17′0″	17′6″	18′6″	19′6″
20 (90 mph)	12	12′6″	12′9″	13′6″	14′0″	14′3″	13′9″	14′3″	14′9″	15′3″	15′6″	16′3″	17′0″	18′0″	17′0″	18′0″	19′0″	19′3″	20′9″	21′9″
	16	12′0″	12′3″	12′9″	13′3″	13′9″	13′0″	13′6″	14′0″	14′6″	14′9″	15′6″	16′3″	16′9″	16′0″	17′0″	17′9″	18′0″	19′3″	20′3″
	24	9′9″	10′9″	11′0″	11′9″	12′0″	11′3″	11′9″	12′3″	12′9″	13′0″	13′6″	14′0″	14′9″	14′0″	14′9″	15′6″	15′9″	16′9″	17′9″
25 (100 mph)	12	11′6″	11′9″	12′6″	13′0″	13′3″	12′9″	13′0″	13′9″	14′0″	14′3″	15′0″	16′0″	16′9″	15′9″	16′9″	17′6″	18′0″	19′3″	20′3″
	16	10′9″	11′3″	11′9″	12′3″	12′9″	12′0″	12′6″	13′0″	13′6″	13′9″	14′3″	15′0″	15′6″	14′9″	15′9″	16′6″	16′9″	18′0″	18′9″
	24	8′9″	10′0″	10′3″	10′9″	11′3″	10′6″	11′0″	11′6″	11′9″	12′0″	12′6″	13′0″	13′9″	13′0″	13′9″	14′3″	14′9″	15′9″	16′6″
30 (110 mph)	12	10′9″	11′3″	11′9″	12′3″	12′6″	12′0″	12′3″	12′9″	13′3″	13′6″	14′3″	15′0″	15′9″	14′9″	15′9″	16′6″	16′9″	18′0″	19′0″
	16	9′9″	10′9″	11′0″	11′9″	12′0″	11′3″	11′9″	12′3″	12′9″	13′0″	13′6″	14′0″	14′9″	14′0″	14′9″	15′6″	15′9″	16′9″	17′9″
	24	8′0″	9′0″	9′9″	10′3″	10′6″	10′0″	10′3″	10′9″	11′0″	10′0″	11′9″	12′3″	12′9″	12′3″	13′0″	13′6″	13′3″	14′9″	15′6″
35 (120 mph)	12	10′3″	10′6″	11′0″	11′6″	12′0″	11′3″	11′9″	12′3″	12′6″	12′9″	13′6″	14′3″	14′9″	14′0″	15′0″	15′9″	16′0″	17′3″	18′3″
	16	9′0″	10′3″	10′6″	11′0″	11′6″	10′9″	11′3″	11′9″	12′0″	12′3″	12′9″	13′6″	14′0″	13′3″	14′0″	14′9″	15′0″	16′0″	16′9″
	24	7′3″	8′3″	9′3″	9′9″	10′0″	8′6″	9′9″	10′3″	10′6″	8′6″	11′3″	11′9″	12′3″	11′6″	12′3″	12′9″	11′6″	14′0″	14′9″
40 (125 mph)	12	9′9″	10′3″	10′9″	11′0″	11′6″	10′9″	11′3″	11′9″	12′0″	12′3″	12′9″	13′6″	14′3″	13′6″	14′3″	15′0″	15′3″	16′6″	17′3″
	16	8′6″	9′6″	10′0″	10′6″	11′0″	10′3″	10′9″	11′3″	11′6″	11′3″	12′3″	12′9″	13′3″	12′9″	13″6″	14′0″	14′3″	15′3″	16′0″
	24	6′3″	7′6″	8′9″	9′3″	9′6″	7′6″	9′6″	9′9″	10′0″	7′6″	10′0″	11′3″	11′9″	10′0″	11′9″	12′3″	10′0″	12′6″	14′0″

(1) Stress based on capacity of studs alone; bending stress: 26,660 psi (33% increase for wind load). Deflection L/600 based on composite wall assembly with noncomposite addition of brick veneer stiffness.

technical data

thermal properties (1)

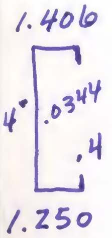
thickness (in)	product	lb/ft³	"R"
2-5	THERMAFIBER Curtain Wall Insulation CW 40 (2)	4.0	4.00 (3)
1½-3½	THERMAFIBER Curtain Wall Insulation CW 70 (2)	6.0	4.17 (3)
1-2½	THERMAFIBER Curtain Wall Insulation CW 90 (2)	8.0	4.35 (3)
½	SHEETROCK Brand Gypsum Panels	50.0	0.45
⅝	SHEETROCK Brand Gypsum Panels	50.0	0.56
⅜	ROCKLATH Plaster Base	50.0	0.32
½	USG Gypsum Sheathing	50.0	0.45

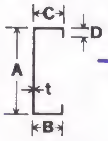
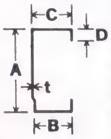
(1) All factors from1972 ASHRAE Guide, Factors at 75°F mean temperature. (2) Factors from U.S.G. data. (3) Per inch thickness.

product identification

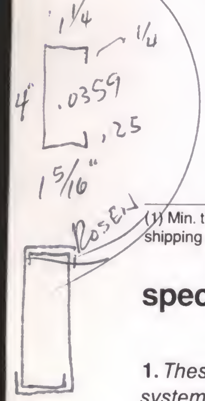
Example: 35SJ8
35 size—3½"
SJ style—SJ stud/joist, CR C-runner
8 thickness designation—in mm x 10

physical properties



stud system		dimension A	B	C	D	metal thick. t (1)	net area sq. in. (2)	avg. wt. lb. per MLF (3)
	212ST10	2½	1.250	1.406	0.406	0.0344	0.197	704
	358ST10	3⅝"	1.250	1.406	0.406	0.0344	0.235	844
	40ST10	4"	1.250	1.406	0.406	0.0344	0.248	891
	60ST10	6"	1.250	1.406	0.406	0.0344	0.317	1,140
	35SJ8	3.448	1.606	1.724	0.500	0.0284	0.213	799
	35SJ10	3.448	1.606	1.724	0.500	0.0344	0.257	948
	35SJ13	3.448	1.606	1.724	0.500	0.0449	0.333	1,218
	35SJ16	3.421	1.552	1.724	0.625	0.0598	0.449	1,600
	35SJ20	3.421	1.552	1.724	0.625	0.0747	0.556	1,969
	40SJ10	3.948	1.606	1.724	0.500	0.0344	0.274	972
	40SJ13	3.948	1.606	1.724	0.500	0.0449	0.356	1,262
	40SJ16	3.921	1.552	1.724	0.625	0.0598	0.479	1,672
	40SJ20	3.921	1.552	1.724	0.625	0.0747	0.593	2,098
	55SJ10	5.448	1.606	1.724	0.500	0.0344	0.326	1,202
	55SJ13	5.448	1.606	1.724	0.500	0.0449	0.423	1,551
	55SJ16	5.421	1.552	1.724	0.625	0.0598	0.569	2,018
	55SJ20	5.421	1.552	1.724	0.625	0.0747	0.705	2,504
	60SJ13	5.948	1.606	1.724	0.500	0.0499	0.446	1,580
	60SJ16	5.921	1.552	1.724	0.625	0.0598	0.599	2,088
	60SJ20	5.921	1.552	1.724	0.625	0.0747	0.742	2,627
	75SJ13	7.448	1.606	1.724	0.500	0.0449	0.513	1,880
	75SJ16	7.421	1.552	1.724	0.625	0.0598	0.689	2,447
	75SJ20	7:421	1.552	1.724	0.625	0.0747	0.854	3,039

(1) Min. thickness without galvanized coating. (2) Excluding galvanized coating. (3) Average shipping weight including galvanized coating.



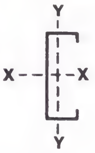
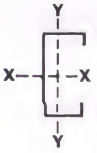
USG Light Steel Framing carries a three-part code that identifies the size (35—3½", 55—5½", etc.), style (SJ—stud or joist, CR—C-runner) and steel thickness based on metric measure (see table).

thickness (1)

thickness designation	mm	in	gauge
8	0.80	0.031	22
10	0.95	0.037	20
13	1.25	0.048	18
16	1.62	0.063	16
20	2.03	0.079	14

(1) Nominal, includes galvanizing.

structural properties

stud system	stud(1)	Ix in⁴	Sx in³	Rx in	Iy in⁴	Sy in³	Ry in
	212ST10	0.202	0.158	1.012	0.048	0.053	0.507
	358ST10	0.477	0.258	1.423	0.054	0.054	0.494
	40ST10	0.601	0.294	1.554	0.054	0.054	0.488
	60ST10	1.579	0.518	2.562	0.057	0.054	0.422
	35SJ8	0.410	0.218	1.393	0.075	0.068	0.636
	35SJ10	0.498	0.275	1.390	0.095	0.083	0.633
	35SJ13	0.640	0.365	1,385	0.131	0.110	0.627
	35SJ16	0.831	0.475	1.358	0.178	0.157	0.630
	35SJ20	1.016	0.581	1.351	0.216	0.190	0.623
	40SJ10	0.680	0.330	1.573	0.097	0.084	0.627
	40SJ13	0.875	0.437	1.567	0.134	0.111	0.621
	40SJ16	1.143	0.571	1.543	0.183	0.159	0.625
	40SJ20	1.400	0.699	1.535	0.226	0.193	0.618
	55SJ10	1.441	0.508	2.685	0.100	0.085	0.579
	55SJ13	1.860	0.674	2.095	0.140	0.112	0.599
	55SJ16	2.453	0.889	2.075	0.205	0.162	0.605
	55SJ20	3.015	1.092	2.067	0.247	0.199	0.597
	60SJ13	2.290	0.761	2.265	0.141	0.112	0.591
	60SJ16	3.028	1.005	2.247	0.208	0.162	0.597
	60SJ20	3.727	1.236	2.238	0.250	0.200	0.589
	75SJ13	3.926	1.043	3.362	0.144	0.113	0.542
	75SJ16	5.215	1.385	2.751	0.214	0.163	0.575
	75SJ20	6.425	1.706	2.741	0.272	0.202	0.567

(1) Maximum allowable flexural stress: 20,000 psi.

specifications–notes to architect

1. *These specifications are for exterior non-load bearing curtain wall systems using USG Steel Framing and securely attached interior and exterior facings. They are presented as a general guide to the architect or structural engineer in preparing project specifications. These systems must not be used without prior structural design by a qualified engineer or architect.*

2. *Maximum allowable wall heights, stud spacings, and runner attachment spacings are shown in Technical Data, pages 11 to 14. Select values and insert in the specifications. Brick veneer must be structurally supported at every floor.*

3. *Framing for window and door openings should have additional reinforcement at the header, sill and jambs to transfer and support all applicable loads. Design should be checked for structural adequacy.*

4. Shadowing and Spotting–*During periods of low outside temperature, condensation may form on outside walls, collecting air-borne dirt to produce shadowing and spotting over fasteners and furring. This is a natural phenomenon which occurs through no fault in the products.*

Where temperature, humidity and soiling conditions are expected to cause objectionable shadowing and spotting, one of the following alternatives should be considered:

a. *The interior facing of Foil-Back SHEETROCK Brand Panels should be furred from the studs using a base layer of panels screw-attached to the studs and horizontally applied USG Metal Furring Channels spaced 24" o.c. (see details, page 10).*

b. *For maximum resistance to shadowing and spotting, a separate chase wall construction is recommended using studs that are independent of the exterior studs and membrane (see details, page 10).*

5. Expansion and Contraction–*Curtain wall surfaces should be isolated with control joints or other means where:* **(a)** *curtain wall abuts a structural element (except floor) or dissimilar wall or ceiling;* **(b)** *construction changes within the plane of the wall;* **(c)** *stucco surfaces exceed 10' in either direction;* **(d)** *the area within stucco sections exceeds 100 square ft;* **(e)** *as required for brick-veneer construction;* **(f)** *the basic construction contains a control joint;* **(g)** *interior partition run exceeds 30'. Ceiling-height door and window frames may be used as control joints, as may less-than-ceiling height frames if control joints extend to the ceiling and floor from both corners.*

Sheathing should be broken behind control joints. Where vertical and horizontal joints intersect, the horizontal joint should be continuous and the vertical joint should abut it. Splices, terminals and intersections should be caulked with a sealant.

6. Air and Water Infiltration–*Flashing and sealants as shown in the details should be provided to resist air and water infiltration. All openings at abutting sheathing must be sealed to prevent direct passage of water. Accessories for stucco finishes should be made of zinc alloy with weep holes 12"o.c. In high-wind areas where moisture may penetrate porous stucco and masonry exteriors, an additional weather-resistive barrier such as 15-lb. felt building paper applied over the gypsum sheathing may be required.*

7. Corrosive Materials–*USG Metal Lath, Control Joints and other USG Metal Accessories should not be used with magnesium oxychloride cement stuccos or portland cement stucco containing* *calcium chloride additives. Zinc-alloy accessories are available from U.S.G. for use in specific applications.*

8. Prefinished Panels–*Ceramic, aggregated or porcelain-enameled panels, metal siding and other dry exterior facings weighing up to 8 psf may be applied over gypsum sheathing and screw-attached to studs. Use stainless steel or cadmium-plated screws, spaced according to siding manufacturer's recommendations. Screws should not transfer more than 15 lb. panel weight per screw to studs. Screw lengths are based on panel thickness plus ⅞".*

9. *See U.S.G. product folders in this series: Gypsum Panels & Accessories Folder SA-927 for information on system components; Paint Products Folder SA-933 for paint specifications; Gypsum Plasters, Bases & Accessories Folder SA-917 for plaster system components and specifications; Fire Safety Systems Folder SA-707 for data on insulation and mineral fireproofing.*

Part 1: general

1.1 scope—*Specify to meet requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during the period of gypsum panel and joint finishing or lath and plaster application, termperatures within the building shall be maintained uniformly within the range of 55°F (13°C). Adequate ventilation shall be provided to eliminate excessive moisture within the building during this period.

1.5 certificates of compliance

Prior to shipping any exterior wall material to the site, the Contractor shall submit to the Architect copies of manufacturer's certificates showing compliance with the air and water infiltration standards set by NAAMM at the specified wind velocity. All certificates shall be issued by an independent testing laboratory.

Part 2: products

2.1 materials manufactured by United States Gypsum

a. **Studs and Runners—**
  1. USG ST10 Studs and CR10 Runners
     212ST10 (2½") 40ST10 (4")
     358ST10 (3⅝") 60ST10 (6")
     Note: Select CR10 Runner to match stud style.
  2. USG Light Steel Studs
     35SJ8 (3½") 40SJ13 (4") 55SJ16 (5½")
     35SJ10 (3½") 40SJ16 (4") 55SJ20 (5½")
     35SJ13 (3½") 40SJ20 (4") 60SJ13 (6" 75SJ13 (7½")
     35SJ16 (3½") 55SJ10 (5½") 60SJ16 (6") 75SJ16 (7½")
     35SJ20 (3½") 55SJ13 (5½") 60SJ20 (6") 75SJ20 (7½")
  3. USG Light Steel Runners
     35CR8 (3½")
     35CR10 (3½") 40CR10 (4") 55CR10 (5½") 60CR13 (6")
     35CR13 (3½") 40CR13 (4") 55CR13 (5½") 75CR13 (7½")
     Note: Select runner to match stud style, except CR13 runner styles are used with SJ16 and SJ20 studs.
  4. USG Steel C-H Studs J-Runners
     212CH8 (2½") 212JR7 (2½")
     400CH10 (4") 400JR7 (4")
  5. USG Standard Studs, *for interior chase wall.*
     158ST5 (1⅝") 212ST5 (2½") 358ST5 (3⅝")
  6. USG Metal Furring Channel, *for furred interior wall.*

b. **Sheathing**—USG Gypsum Sheathing—½" thick, (2', 4'x8') USG Triple-Sealed Gypsum Sheathing—.40" thick, (4'x8'), (4'x9'); USG Gypsum Liner Panels—1" thick, 2' x lengths to 16', *(for use with C-H Stud Infill Panel System).*

c. **Insulation—**
  1. THERMAFIBER Metal Stud Insulating Blankets—(3") (3⅝") thick, (16") (24") wide x (48") (96") long or Contractor CW-40 THERMAFIBER Insulation (1") (1½") (2") thick, (16") (24") wide x 60" long.
  2. THERMAFIBER Sound Attenuation Blankets—(1½") (2") (3") thick, x (16" x 48") (24" x 48"). *(Use where noncombustibility is required. Specify foil-back interior gypsum panels or lath as vapor barrier.)*
  3. THERMAFIBER Safing Insulation—(2") (4") thick, 24" wide, ( ) long, 4 pcf min. density, (with foil facing) (with galvanized steel impaling clips) (with fire-resistant adhesive).

d. **Gypsum Panels—**
  1. Face Boards—Foil-Back SHEETROCK Brand (FIRECODE) Gypsum Panels (½") (⅝") thick, 48" wide, lengths as required.
  2. Backing Boards—Regular SHEETROCK Brand Gypsum Panels (½") (⅝") thick, 48" wide, lengths as required *(for furred wall construction).*

e. **Gypsum Base—**
  1. Foil-Back ROCKLATH Plaster Base *(for standard plasters)* ⅜" thick, (16" x 48") (16" x lengths as required).
  2. Foil-Back IMPERIAL Gypsum Base *(for veneer plasters)* ½" thick in Regular and FIRECODE "C", ⅝" in Regular, FIRECODE, and FIRECODE "C".

f. **Plasters for Interior Surfaces**
  1. Standard Plasters and Finishes—
     a. RED TOP Gypsum Plaster (100:2).
     b. RED TOP Wood Fiber Plaster (100:1).
     c. STRUCTO-BASE Gypsum Plaster (100:2).
     d. STRUCTO-GAUGE Gauging Plaster and IVORY Lime (1:1 or 1:2).
     e. RED TOP Keenes Cement and IVORY Lime (4:1 or 2:1).
  2. Veneer Finishes—
     a. IMPERIAL Finish *(single-coat system).*
     b. IMPERIAL Basecoat *(two-coat system; specify finish plaster from d or e above or c below).*
     c. DIAMOND Interior Finish *(single-coat system or two coat system over IMPERIAL Basecoat).*

g. **Metal Lath**—3.4-lb. USG Galvanized (Self-Furring) (Poly-Backed) Junior Diamond Mesh Lath 27" x 96".

h. **USG Screws and Clips—**
  1. (1") (1¼") (1⅝") Type S-12, Bugle Head.
  2. ⅜" Type S-12, Pan Head, or ½" Type S-12 Low-Profile Head.
  3. 1" Type S, Bugle Head, *for style ST5 USG steel components.*
  4. 1¼" Type S-12 Pancake Head cad. plated.

i. **Lathing Accessories**–*(Specify from Gypsum Plasters, Bases & Accessories folder SA-917; specify 1" grounds; 1" casing beads not available from U.S.G.).*

j. **Exterior Stucco Finish**—ORIENTAL Exterior Stucco.

k. **Stucco Lime**—BONDCRETE Air-Entraining Lime.

l. **Drywall Accessories**—*(specify from U.S.G. Folder SA-927).*

m. **Joint Treatment**—*(specify from U.S.G. Folder SA-927).*

2.2 materials by other manufacturers

a. **Portland Cement-Lime Stucco**—Mixed in accordance with ANSI A42.2, Type L. Proportions: scratch coat—1 bag cement: ¾ to 1 bag BONDCRETE Lime: 5 to 6 cu. ft. sand; brown coat—1 bag cement: 1 bag lime: 6 to 7 cu. ft. sand; finish coat—1 bag cement: 2 bags lime: 7 to 10 cu. ft. sand.

b. **Marblecrete Materials**—(specified by architect) meeting requirements of local contractors' association and jurisdictional authorities (stucco applied to a full 1" thickness).

c. **Masonry Materials**—
  1. Brick, face or common; or other masonry units, and type N mortar (specified by architect).
  2. Brick anchors—as recommended by the Brick Institute of America.

d. **Runner Fasteners**—power-driven type with ability to withstand (193) (300) (400)-lb. single shear and (200) (300) (400)-lb. bearing force when driven into structural head or base and without exceeding allowable stress in runner, fastener or structural support.

e. **Polyethylene Film**—8 mil thick, clear.

f. **Horizontal Flashing Control Joint**—24-ga. G-90 hot-dipped galv. steel. See details page 4.

Part 3: execution

3.1 erection

3.1.1 studs and runners

a. Align runner track accurately according to exterior wall layout and secure to base and head with power-driven fastener spaced ( ) o.c. *Specify from table page 11.*

b. Position steel studs vertically in runners and space no greater than (12″) (16″) (24″) *(choose spacing from Technical Data tables).* Securely anchor each stud to runners with four ⅜″ Type S-12 Pan Head or ½″ type S-12 Low-Profile Head Screws, two at top and two at bottom, with one screw in each flange.

c. For chase wall, align additional interior runners accurately at floor and ceiling and securely anchor with suitable fasteners spaced not more than 24″ o.c. Position studs vertically in runners, spaced no greater than (12″) (16″) (24″) o.c. and located no more than 2″ from all door and window jambs, abutting partitions, partition corners and other construction. Anchor all studs located adjacent to door and window frames, partition intersections and corners to runner flanges by positive screw engagement through stud and runner flanges.

3.1.2 exterior sheathing

Screw-attach USG Gypsum Sheathing or Triple-Sealed Gypsum Sheathing to exterior of each stud with 1″ Type S-12 Screws spaced ⅜″ from ends and edges and approx. 8″ o.c. When stucco exterior will be applied, sheathing may be tacked in place, since later application of self-furring metal lath will complete sheathing anchorage. All sheathing tacked in this manner must be covered with metal lath immediately.

3.1.3 exterior metal lath and accessories

a. Apply metal lath with long dimensions across supports, with ends lapped 1″ and staggered in adjacent courses. sides lapped ½″. Screw-attach self-furring metal lath through sheathing to steel studs and runners with 1¼″ Type S-12 Screws 8″ o.c.

b. Install USG Control Joint No. 100 where indicated on the drawings. Back control joints with 9″ wide, No. 15 asphalt felt strips stapled to the sheathing. Install joints with flanges under self-furring lath and attach with Bostitch 9/16″ "G" staples or equal, spaced 6″ apart on each flange. Break supporting members, sheathing and metal lath behind control joints. Apply sealant at all splices, intersections and terminals.

c. Apply other lathing accessories per U.S.G. Folder SA-917.

3.1.4 C-H studs and runners

a. Position J-Runners at floor and ceiling with short leg toward inside of wall and secure with power-driven fasteners spaced ( ) o.c. *Specify from table page 11.*

b. Cut Infill Panels 1″ less than floor-to-ceiling height. Drive two 8d Duplex nails into bottom of panel, 4″ from each edge. Install first panel, position C-H Stud on free end of panel, then continue alternate panel and stud applications to complete wall. For installation instructions, see U.S.G. Curtain Wall Design Manual CS-25.

3.1.5 masonry materials

a. Erect per architect's specifications and details.

b. Anchor brick with approved masonry anchors screw-attached to each steel stud using 1¼″ Type S-12 Pancake Head Cadmium-Plated Screws. Anchor other masonry units to each stud in a similar manner, 16″ o.c. max. or as recommended by the Brick Institute of America.

3.1.6 other dry exterior facings

Follow manufacturer's recommendations for application.

3.1.7 insulation

Insert THERMAFIBER Metal Stud Blankets between studs and staple to the gypsum sheathing using 9/16″ staples with divergent points place at each corner and in the center or each blanket, or friction-fit Contractor CW-40 THERMAFIBER Insulation between the steel studs. Install THERMAFIBER Safing Insulation of proper size on (impaling clips) (support brackets) spaced as needed, 24″ o.c. max., in safe-off area between curtain walls and floor slabs, leaving no voids.

3.1.8 drywall interior

a. Position Foil-Backed SHEETROCK Brand (Firecode) Gypsum Panels vertically or horizontally and attach to studs with 1″ Type S-12 Screws spaced 8″ o.c.

b. For furred interior construction, apply regular SHEETROCK Brand Gypsum Panels vertically or horizontally and attach to studs with 1″ Type S-12 Screws 8″ o.c. Over the first panel layer, apply USG Metal Furring Channels horizontally 24″ o.c. and screw-attach through panels into metal studs. Attach each channel attachment flange to each stud with 1″ Type S-12 Screws. Screw-attach a second layer of foil-back panels to furring channels with 1″ Type S Screws spaced 12″ o.c.

c. For chase wall interior construction, space gypsum panel or steel stud cross braces not to exceed 48″ o.c. vertically. Screw-attach gypsum braces to stud webs with three Type S-12 Screws or screw-attach steel stud and runner braces with ⅜″ Type S-12 Screws. Apply Foil-Back SHEETROCK Brand Gypsum Panels to interior stud row with 1″ Type S Screws spaced 12″ o.c.

d. Install drywall accessories, finish joints, accessories and screw heads per U.S.G. Folder SA-927.

3.1.9 standard lath and plaster interior

a. Apply Foil-Back ROCKLATH Plaster Base face out with long dimension across studs. Butt ends together over studs with joints staggered in successive courses. Attach lath to each steel stud with 1″ Type S-12 Screws spaced 8″ o.c. and at least ⅜″ from ends and edges.

b. Install lathing accessories and apply gypsum sand basecoat and finish plaster per U.S.G. Folder SA-917.

3.1.10 veneer finish interior

a. Apply Foil-Back IMPERIAL Gypsum Base vertically or horizontally and attach to studs with 1″ Type S-12 Screws 8″ o.c.

b. Install lathing accessories and apply IMPERIAL Plaster per U.S.G. Folder SA-917.

Trademarks: The following trademarks used herein are owned by United States Gypsum Company: USG, THERMAFIBER, FIRECODE, SHEETROCK, IMPERIAL, ROCKLATH, RED TOP, PERF-A-TAPE, STRUCTO-BASE, STRUCTO-GAUGE, IVORY, ORIENTAL, DIAMOND, BONDCRETE.

Note: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

Notice: WE SHALL NOT BE LIABLE FOR INCIDENTAL AND CONSEQUENTIAL DAMAGES, DIRECTLY OR INDIRECTLY SUSTAINED, nor for any loss caused by application of these goods not in accordance with current printed instructions or for other than the intended use. Our liability is expressly limited to replacement of defective goods. Any claim shall be deemed waived unless made in writing to us within thirty (30) days from date it was or reasonably should have been discovered.

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BUILDING AMERICA
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SA
905

9.1/Una

USG sound control ceilings

product folder

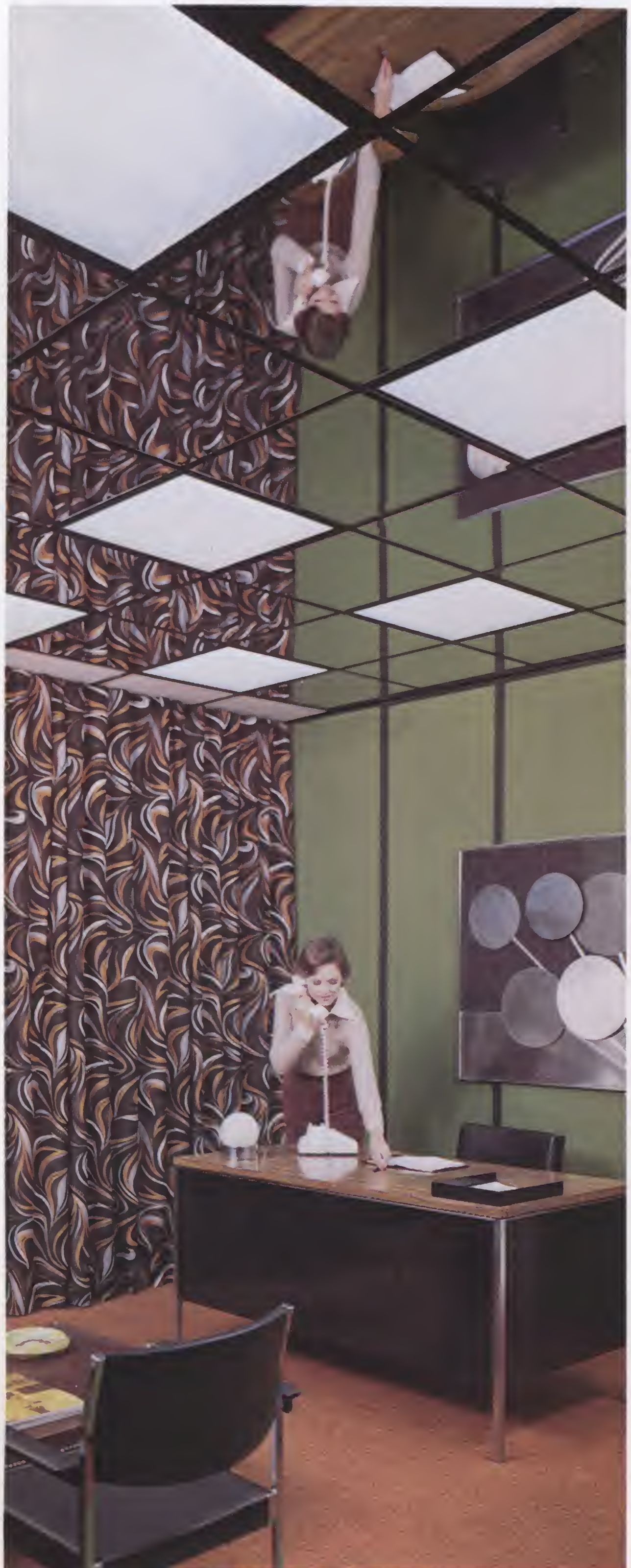
UNITED STATES GYPSUM
1977—1

9 P

ACOUSTICAL TREATMENT
tile, panels & accessories

Front Cover: Deep fissuring of popular new Boulder pattern in ACOUSTONE Panel ceiling combines with recessed Shadow Line suspension to contribute rich texturing to this bank's handsome interior.

Unique new VISTA SONIC Mirrored Ceiling Panels combine sound absorption with dramatic decorative potential. Natural, clear reflection also improves security in stores and shops. Gold- and black-reflective tints also available; see page 19 for details.



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description and utility

Whatever your ceiling requirements—sound absorption or attenuation, fire protection, accessibility, air distribution, even compatible color—these sound control products, the industry's finest, will fulfill the function.

Through anticipatory research and development, the U.S.G. product line offered today is the most complete ever—ceiling surfaces of classic design and functional beauty in a range of textures and patterns to suit virtually any room and any condition.

The wide scope of types and sizes is presented on the next two pages; detailed descriptions of individual products follow. Fire-rated designs are detailed on pages 11, 16 to 18 and 20.

U.S.G. Sound Control Products are sold installed, on a contract basis by qualified acoustical contractors. The contractor furnishes all materials and labor necessary to complete the job in accordance with the specifications in this folder.

Complementary components designed as part of an integrated system give assurance of fine appearance and reliable performance. Your U.S.G. representative is happy to supply information.

"F" Fissured ACOUSTONE Tile in factory-applied Sandstone color blends beautifully with lush greenery to tame this exotic wall design.

types and sizes

ACOUSTONE Tile and Panels, prestige sound control materials, are molded mineral fiber units in sizes from 12″x12″ to 24″x48″ as shown below (plus other sizes cut from 24″x48″ or 24″x72″ molds on special order). ACOUSTONE comes in eleven standard patterns and four color tints plus white, with specific types for fire, sound and special conditions. The thermal resistance (R) is 2.12 (Installed Resistance‡ of Foil-Backed ACOUSTONE is 4.20 upward and 11.08 downward).

product	pattern	nom. thickness	module size (in.)	edge		installation			weight psf
				SE	BE	adhes.	conc.	exp. grid	
Tile									
ACOUSTONE	"F" Fissured	¾″	12x12 to 12x48	x	x	x	x		1.25
	Glacier	¾″	12x12	x		x	x		1.25
			12x24	x			x		1.25
	Finesse	¾″	12x12		x	x	x		1.25
			12x24		x		x		1.25
	Domino	¾″	12x12	x		x	x		1.25
Foil-Backed ACOUSTONE	Fissured	¾″	12x12 to 12x48	x	x		x		1.30
			24x24	x	x		x		1.30
			12x24		x		x		1.30
	Glacier	¾″	12x12	x			x		1.30
			12x24	x			x		1.30
	Finesse	¾″	12x12		x		x		1.30
			12x24		x		x		1.30
ACOUSTONE FIRECODE (7)	Fissured, Glacier, Finesse	¾″	12x12	x	x(1)		x		1.30
AIRSON ACOUSTONE (A-2, A-5, and unslotted)	Fissured	¾″	12x12 to 24x24	x	x		x		1.30
	FIRECODE Fissured	¾″	12x12	x	x		x		1.30
	Glacier	¾″	12x12, 12x24	x			x		1.30
	FIRECODE Glacier	¾″	12x12	x			x		1.30
MOTIF'D ACOUSTONE	Georgian, Striated, Galaxy, Fantasia	¾″	12x12	x			x		1.35
Panels				Sq.	SL	AE			
Foil-Backed ACOUSTONE (2)	Fissured, Finesse	¾″	24x24, 36, 48	x	x			x	1.30
	Glacier, Seacrest		24x24, 36, 48	x	x	x(6)		x	1.30
	Boulder, Butte		24x24, 24x48		x			x	1.30
ACOUSTONE FIRECODE (2) (7)	Fissured, Glacier, Finesse, Seacrest	¾″	24x24	x	x			x	1.30

‡Installed Resistance includes "R" for inside air film and air space above installed unit.

ACOUSTONE Space Units are molded mineral fiber sound absorbers for surface-mounting on ceilings and walls where exceptional absorption and special treatment are required. Space Units are provided in two patterns; several installation methods may be used.

product	pattern	nom. thickness	module size (in.)	edge	installation	weight psf
ACOUSTONE Space Units	Glacier, Finesse	2¼″	10½x10½	beveled	clip or adhesive	3.00 lbs./Unit

ACOUSTISORBER Space Units, Panels and Screens provide supplemental sound absorption and attenuation for noisy industrial plants. They are economical mineral-fiber pads, plastic-encased and metal-framed. **Space Units** are 20″x24″ for suspension overhead, spacing dependent on sound reduction desired, to absorb reflected noise. **Panels** are 2x4 ft. for wall mounting to control reverberation and noise build-up. **Screens** are similar to Panels except 8 or 12 ft. in length, for suspended or free-standing enclosure of noise sources.

Abbreviations: adhes.—adhesive; SE—square edge, standard kerf; BE—beveled edge, standard kerf; Sq.—trimmed square edge, no kerf; SL—edge rabbeted for Shadow Line; AE—Accent Edge rabbeted like Shadow Line, additionally beveled approx. 30° to panel plane; BB—butt beveled edge, no kerf; conc.—concealed suspension; exp. grid—exposed grid suspension, direct hung; psf—pounds per square foot; perf.—perforated.

AURATONE Tile and Panels are water-felted mineral fiber acoustical products marketed in eight patterns and sizes of 12″x12″ to 30″x60″. Thermal resistance (R) is 1.47(½″), 1.85(⅝″) and 2.18(¾″) for regular AURATONE materials and 1.85(⅝″) and 2.14(¾″) for AURATONE FIRECODE products.

product	pattern	nom. thickness	module size (in.)	edge		installation			weight psf
				BB	BE	adhes.	conc.	exp. grid	
Tile									
AURATONE	Pin-Perf.	½″	12x12	x		x			.80
			12x24			x			.80
		⅝″	12x12		x	x	x		1.00
			12x24		x		x		1.00
			24x24		x		x		1.00
AURATONE FIRECODE	Pin-Perf., Fissured, Filigree, Nordic, Mecca	⅝″	12x12		x(4)		x		1.15
			24x24		x		x		1.15
		¾″	12x12, 12x24		x(4)		x		1.37
AIRSON AURATONE FIRECODE (A-2, A-5, and unslotted)	Fissured	⅝″	24x24		x		x		1.15
		¾″	12x12, 12x24		x(4)		x		1.40
Panels									
AURATONE	Pin-Perf., Fissured, Filigree, Nordic, Mecca	⅝″	24x24, 24x36	x				x	.81
		¾″	24x48, 24x60 (3)	x				x	1.00
	Fissured, Filigree	⅝″	24x24, 24x48		x			x	.81
AURATONE FIRECODE	Pin-Perf., Fissured, Filigree, Nordic, Mecca	⅝″	24x24, 24x48,						1.15
		¾″	30x60(5)	x				x	1.37
AIRSON AURATONE A-2, A-5, and unslotted)	Fissured, Filigree	⅝″	24x24, 24x36, 24x48, 24x60	x				x	.81
AIRSON AURATONE FIRECODE (A-2, A-5, and unslotted)	Fissured, Filigree	⅝″	24x24, 24x48,						1.15
		¾″	30x60(5)	x				x	1.37
AURATONE FIRECODE HF	Pin-Perf., Nordic, Mecca	¾″	24x24, 24x48	x				x	1.40

VISTA SONIC Mirrored Ceiling Panels are constructed from water-felted mineral fiber acoustical board, framed, and covered with .001-in. thick aluminized polyester film stretched to form a mirror. Available in clear, gold or black reflective tints, produced in one thickness and two sizes for lay-in suspension in standard exposed grid system. Thermal resistance (R) is 1.85.

product	pattern	nom. thickness	module size (in.)	edge	installation	weight psf
VISTA SONIC Mirrored Panels	Optically reflective	¹⁵⁄₁₆″	24x24, 24x48	Sq.	exp. grid	1.45

USG Gypsum Ceiling Panels offer fire-rated construction, without sound absorption, by means of economical lay-in application. They are supplied in ½″ thick, in 24″x24″ and 24″x48″ sizes. Thermal resistance (R) is 0.45.

USG Gypsum Ceiling Panels						
Interior	Texture-painted	½″	24x24, 24x48	Sq.	exp. grid	1.88
Exterior	Texture-painted	½″	24x24, 24x48	Sq.	exp. grid	1.88

USG Asbestos Board is produced in 24″x24″ and 24″x48″ sizes for lay-in installation in exposed grid suspensions. While sound absorption of panels alone is negligible, they are effective when perforated and backed by sound-absorbing material.

USG Asbestos Board	Perf., Unperforated	³⁄₁₆″	24x24, 24x48	Sq.	exp. grid, or nail	1.50-1.75

NOTES: (1) Glacier pattern not available with beveled edge. (2) Also available in AIRSON A-2, A-5 and unslotted, except Boulder and Butte patterns. (3) Other sizes available on special order. (4) Beveled edge, tongue and groove. (5) 30″x60″ panels not available ⅝″ thick in Fissured and Filigree patterns. (6) 24″x24″ only. (7) Formerly ACOUSTONE "90" and "120" Tile and Panels.

ACOUSTONE Mineral Acoustical Tile and Panels... prestige products for creative ceiling designs

Acoustone, with its elegant patterns and textures, sets the industry standard for beauty and efficient sound attenuation and absorption. Now, more than ever before, its range of sizes, edge treatments and suspension methods offer complete flexibility of concept to the designer.

Designed to absorb sound originating within a room, Acoustone Tile and Panels are manufactured by binding mineral fibers into a lightweight, highly decorative product. The molding process insures that no two tile surfaces are monotonously alike. Yet in total, they blend to form ceilings of unique beauty.

Acoustone Mineral Acoustical Tile and Panels are manufactured under rigid tolerances to produce closely controlled dimensions. All types have been tested in accordance with AMA 1-II attenuation and ASTM C423 absorption procedures—data reported on pages 24 and 25.

Fire and Sound Ratings—Meets Federal Spec. SS-S-118a, Type III, Class 25; Fire Hazard Classifications (ASTM E84 test procedure): flame spread 15, fuel contributed 15, smoke developed 0 to 15; also flame spread 25, fuel contributed 30, smoke developed 0. See page 11 for assemblies with fire ratings up to 2 hrs., page 25 for tested sound attenuation up to STC Range 55-60.

Thermal Resistance (R)—2.12

installed resistance (1):	heat flow up	heat flow down
adhesive mounting	2.72	3.02
metal suspension		
(unbacked)	4.18	4.88
(foil-backed)	4.20	11.08

(1) R-factors shown include "R" for inside air film and air space above installed ceiling unit.

Maintenance—The smooth painted finish resists soiling and limits objectionable air travel (breathing) through face of tile. Standard finish is washable vinyl coating, factory applied and heat cured. Also see Acoustone PC, page 11.

Tile and panels may be washed with damp sponge or cleaned with a vacuum cleaner, or chemical rubber sponge (used dry). To paint, roll or spray with a non-bridging paint (Tal Latex Wall Paint or equal).

limitations

Installation of Acoustone Tile or Panels should not begin until residual moisture from plaster, concrete or terrazzo work is dissipated. Acoustone is designed for installation and use under standard occupancy conditions at no more than 80% RH.

Acoustone Tile or Panels should not be used: (a) where continuously exposed to high humidity; (b) below wainscot height or where exposed to impact, abrasion or tampering. To prevent objectionable sag, the weight of overlaid material such as insulation should be limited to a uniform load of 0.75 psf maximum. Such material nullifies the fire rating of Acoustone Firecode.

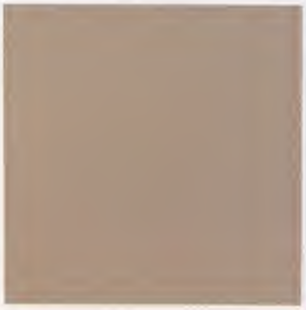
Colors that make ceilings come to life

Acoustone Mineral Tile and Panels now introduce prestige ceilings in *color*. At nominal added cost they contribute color along with the outstanding surface design and sound-absorption qualities for which they are noted.

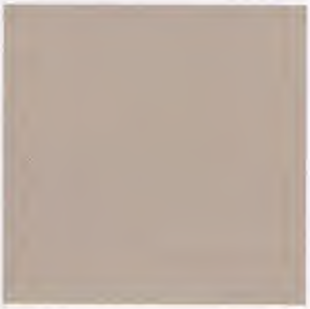
Four pleasing earthtone colors are available, each to lend ceilings a compatible, subtle shading for total harmony in interiors of true distinction: *Sandstone, Clay Gray, Pumice* and *Ivory*. These tasteful neutral tints blend beautifully with decor and furnishings of nearly any room design.

All seven standard Acoustone patterns, from "F" Fissured to Butte, are available in all four tints, providing 28 distinct possibilities for interior effects. The factory-applied color, of uniform thickness and shading, emphasizes textural detail. From the ruggedness of Boulder to the gentle regularity of Finesse pattern, the changing play of light and shadow gives each Acoustone color/pattern combination its own unique effect.

SANDSTONE



CLAY GRAY



PUMICE

IVORY

Rugged sculpturing of Boulder pattern is emphasized in this 2x2-ft. ACOUSTONE Panel ceiling. Recessed suspension grid in matching white color is made unobtrusive by Shadow Line panel edges. ▶

INDIANA BANK AND TRUST COMPANY OF FORT WAYNE, Ft. Wayne, Ind.

EXIT

ACOUSTONE patterns

FISSURED

GLACIER

FINESSE

SEACREST

BOULDER

BUTTE

DOMINO

"F" Fissured . . . a bold—yet orderly—statement of classic beauty

Tile and panels are molded, screeded and planed to achieve a broad range of textures, from modest veining to bold fissures, resembling the natural beauty of travertine marble. These wide variations of fissure assure that no two tile faces will be exactly alike. When installed in a random application of fissure direction and intensity, Acoustone "F" pattern is truly non-directional.

Glacier . . . rugged texture denoting stability

The heavily fissured, rough surface of Glacier Acoustone Tile and Panels complements contemporary architecture's emphasis on natural texture. The screeded, unplaned finish was the first such treatment in acoustical tile products. Edge joints (and air distribution orifices), while not hidden, are generally obscured by the rich, deeply etched texture.

Finesse . . . light, subtle fissure for delicate, formal settings

Sophisticated environments suggest the finesse of Finesse Acoustone Tile or Panels. The fissures are the same natural, non-repeating pattern as "F" Fissured, but much smaller and more subtle. The surface is finely planed to tailor the unit; the beveled edges hide minor suspension irregularities.

Seacrest . . . fluid roughness reminiscent of boiling, running surf

The reticulated, nearly non-directional pattern of Seacrest Acoustone Panels brings unique excitement to dull, uninteresting areas. Square-cut, Shadow Line or Accent Edge configurations are available for lay-in application.

Boulder . . . coarsest surface for accenting the natural effect

This pattern provides the bold scale in acoustical ceilings to complement massive-proportioned interiors and rough-hewn surfaces. Each panel is subtly unique, in 24"x24" or 24"x48" lay-in sizes to emphasize the magnified scale. Shadow Line edge smoothly mates pattern roughness with suspension grid.

Butte . . . contemporary texture for larger interiors

A coarse, sharply contrasting texture of random-shaped smooth surfaces with deep, large-scale fissures lends design variety easily visible on high ceilings. Pattern scale is emphasized by 24"x24" or 24"x48" panel size, while grid is partly concealed by the recessed Shadow Line edge.

Domino . . . striking frankness in small scale

Routed to simulate nine mini-tile in each 12"x12" unit, Domino Acoustone Tile boldly draws attention to the ceiling with its striking pattern. Ideally suited to rooms of smaller scale, Domino is refreshingly honest about being tile. Fissures are of the same scale and type as those of "F" Fissured.

MOTIF'D ACOUSTONE Mineral Acoustical Tile . . . ultimate in distinctive appearance

These four impressive patterns are produced by altering Acoustone Tile by a process that permanently etches a bas relief design into the surface. The patterns are accented by the varying shadows caused by directional influence of the lighting, rather than by applied color. Four 12"x12" tiles complete the basic pattern, except in Galaxy. Motif'd Acoustone provides NRC ranges up to .75-.85 and Grade LR 1 light reflectance. All patterns are also available in Foil-Backed Acoustone and Acoustone Firecode.

limitation

When installing Striated pattern, a checkerboard arrangement of tile (illustrated at right) is recommended to avoid noticeable misalignment of the striations.

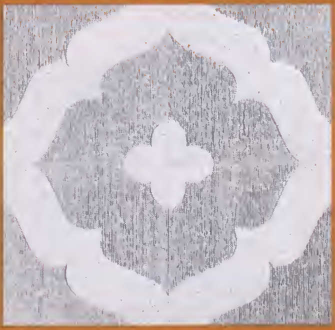
Custom MOTIF'D ACOUSTONE Tile . . . designed by you for personalized effect

Almost any custom pattern desired—company logograms, function designs, institutional symbols—can be produced with the same methods as in Motif'd Acoustone Tile. Designs may be repeated over the entire ceiling or intermixed with standard patterns of Acoustone Tile to achieve the desired results. U.S.G. Sales Engineers can advise the additional cost and complete ordering details for Custom Motif'd Acoustone.

Galaxy pattern of MOTIF'D ACOUSTONE Tile dramatizes this plain church interior with rich, contrasting appearance.

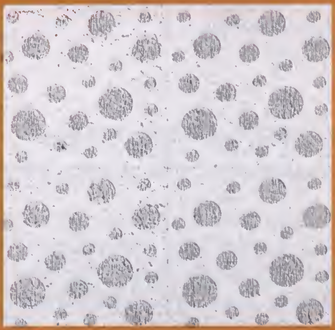
ST. ANN'S CHURCH, Avon, Conn.

MOTIF'D ACOUSTONE patterns

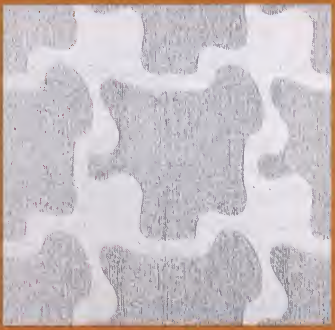


GEORGIAN

STRIATED



GALAXY



FANTASIA

In this specialty shop, 2x2-ft. Seacrest ACOUSTONE Panels with Shadow Line edge quiet the clatter and lend pleasant contrast in pattern and texture.

LE BARON HOTEL, San Diego, Calif.
Architect: RON DAVIS, AIA

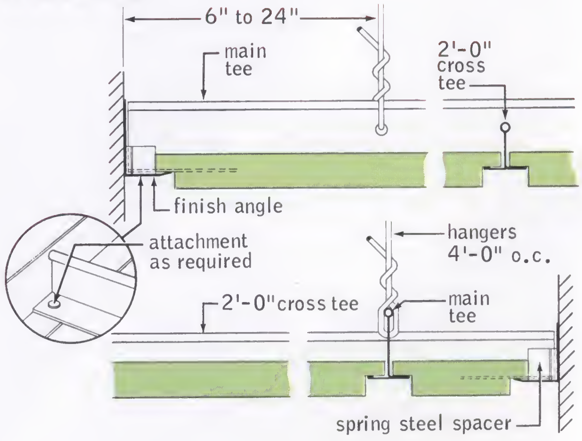
Shadow Line ACOUSTONE Panels . . . functional design that speaks for itself

Deep-rabbeted edges of these 24″x24″ or 24″x48″ panels combine with direct-hung exposed grid suspension system (see drawing, right) to produce one of the most impressive acoustical ceiling treatments available today. The massive-sized panels give any room a bold new scale, and texture is magnified to match when new ACOUSTONE **Boulder** and **Butte** patterns are used. All patterns and colors of these sizes are available with Shadow Line edges.

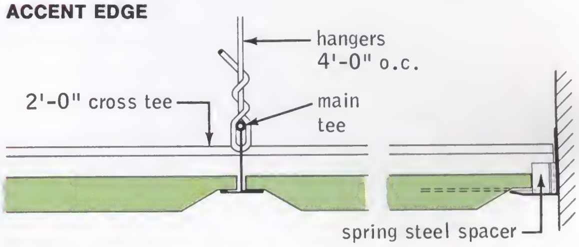
Accent Edge ACOUSTONE Panels . . . dramatic detail that expands ceiling mass

With Accent Edge, the crisp-lined contemporary look of Shadow Line takes on the traditional feeling of mass. This shallow-chamfered edge blends suspension grid with ceiling panels for a "paneled look"; the increased visible surface area subtly accentuates the rugged mass of rough-textured **Glacier** and **Seacrest** patterns, both available in 24″x24″ panels. Accent Edge helps compensate for slight misalignments, affords quick lay-in installation. Exclusive with U.S.G.

SHADOW LINE



ACCENT EDGE



9.1/Una

Special-Function ACOUSTONE Tile and Panels . . . with desired fire, sound, maintenance features

Fire-Rated ACOUSTONE provides 1, 1½ or 2-hr. fire protection in all patterns, along with UL label service. It offers the same high sound absorption, light reflection and fissured beauty of regular Acoustone Tile.

Foil-Backed ACOUSTONE gives the same appearance and excellent acoustical performance as regular Acoustone Patterns. In addition, a special reflective aluminum foil on the back surface provides improved resistance to breathing and substantially greater insulating effect against heat loss/gain. This translates into operating cost savings for summer cooling (over 40%) and winter heating (over 10%) which—at today's escalating fuel prices—quickly return the small cost premium, then continue to reduce energy costs. The product's effectiveness is shown by the "R" factors on page 6, and in separate U.S.G. brochure SC-832.

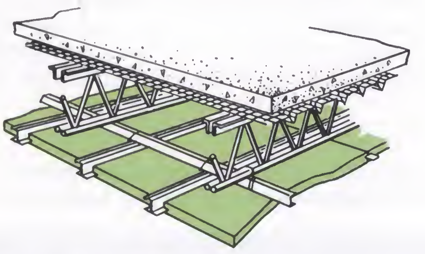
Foil backing available on all Acoustone Tile and Panels as well as Motif'd Acoustone Tile.

ACOUSTONE PC Tile and Panels are supplied with a factory-applied plastic surface coating, ideal for reducing maintenance in ceilings where high soiling is anticipated. Other tile characteristics remain unchanged. All Acoustone products are available with this plastic coating.

UL Designs for ACOUSTONE products

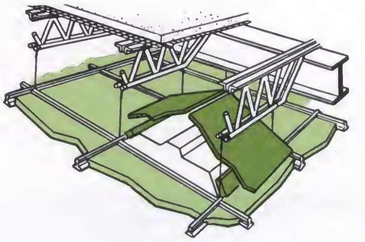
bar joist/concrete deck on riblath

2-Hr. UL Design G018 (was 41-2-Hr.)
ACOUSTONE FIRECODE Mineral Tile, 12" x 12", suspended on concealed Z-splines hung from bar joists with concrete deck above.



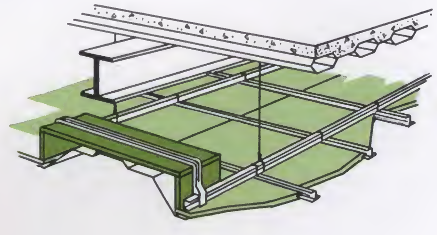
1½-Hr. UL Design G020 (was 6-1½ Hr.)
ACOUSTONE FIRECODE Mineral Tile, 12" x 12", suspended on concealed Z-splines hung from bar joists with concrete deck above.

2-Hr. UL Design G228 (Beam 2 Hr.) (was 278-2 Hr.)
ACOUSTONE FIRECODE Mineral Tile, 24" x 24", laid on direct-hung Shadow Line grid suspension with concrete deck above.†



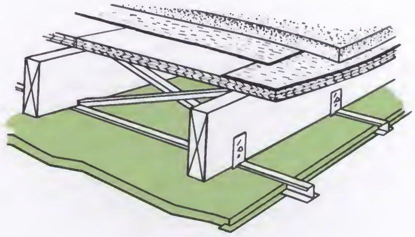
steel frame, floor/concrete deck

2-Hr. UL Design A010 (was 85-2 Hr.)
ACOUSTONE FIRECODE Mineral Tile, 12" x 12", suspended on indirect-hung concealed Z-splines with concrete deck above.†

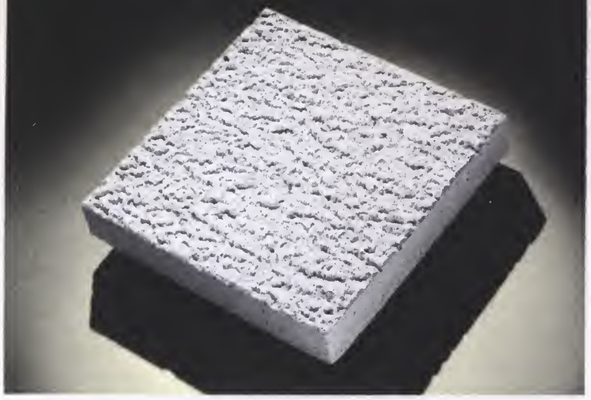


wood joists & subfloor

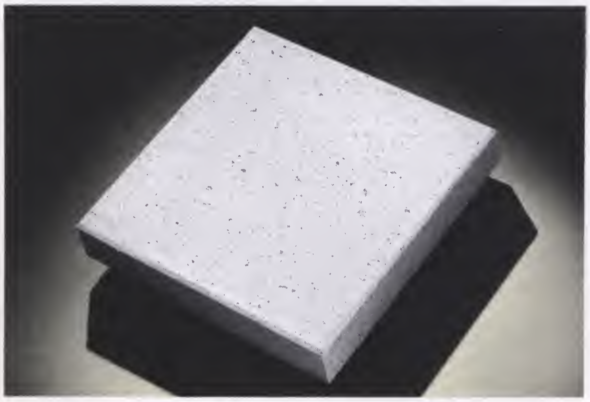
1-Hr. UL Design L003 (was 15-1 Hr.)
ACOUSTONE FIRECODE Tile, 12" x 12", on concealed Z-splines attached to wood joists with wood floor or MASTICAL Underlayment Compound.



†AIRSON ACOUSTONE FIRECODE Tile may be substituted.



GLACIER . . . Bold, rich texturing created by deep, heavy fissures on the natural, unplaned surface



FINESSE . . . Classically beautiful and subdued . . . created by subtle fissures within the finely textured natural surface

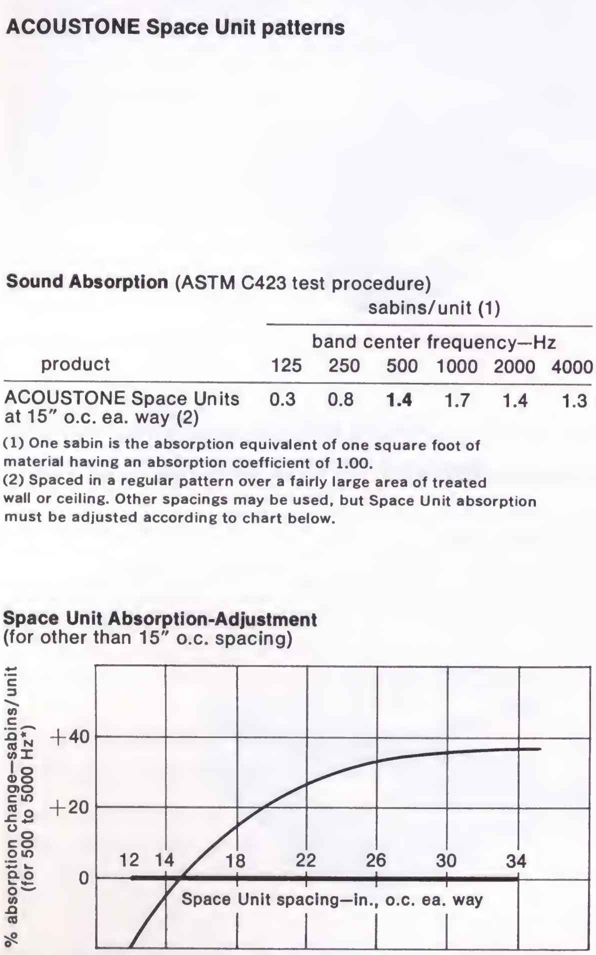
ACOUSTONE Space Unit patterns

Sound Absorption (ASTM C423 test procedure)

	sabins/unit (1)					
	band center frequency—Hz					
product	125	250	500	1000	2000	4000
ACOUSTONE Space Units at 15″ o.c. ea. way (2)	0.3	0.8	**1.4**	1.7	1.4	1.3

(1) One sabin is the absorption equivalent of one square foot of material having an absorption coefficient of 1.00.
(2) Spaced in a regular pattern over a fairly large area of treated wall or ceiling. Other spacings may be used, but Space Unit absorption must be adjusted according to chart below.

Space Unit Absorption-Adjustment
(for other than 15″ o.c. spacing)



*125 and 250 Hz bands not shown, since their absorption change at spacings greater than 15″ o.c. is negligible and at closer spacing cannot be extrapolated.

ACOUSTONE Space Units . . . simplified modern method of adding absorption

Uncontrolled reverberations transform sound into noise, muffling music and disrupting effective communication. ACOUSTONE Space Units control reverberation for optimum acoustics in a wide variety of room functions. These efficient Space Units *absorb sound on all six surfaces* to reduce reverberation, the amount depending upon number and spacing of Units and sound source frequency. They also are effective in eliminating flutter echo, reducing noise levels and treating "spot" problem areas in both new construction and remodeling.

ACOUSTONE Space Units are free-standing, sound-absorbing design plaques composed of mineral fibers and binder, molded to form lightweight units. They can be used in many possible arrangements on either walls or ceilings as primary acoustical treatment, or as an economical supplement to other acoustical control.

Produced in two patterns—**Finesse,** with a finely textured smooth surface, and **Glacier,** featuring a heavily fissured rough surface—10½″ sq. x 2¼″ thick, designed for surface-mounting with two types of metal clip hardware or adhesive. Standard color is the same white as available for regular ACOUSTONE Ceiling Tile and Panels. Standard finish is washable vinyl coating, factory-applied and heat-cured.

For details, see U.S.G. data folder SC-823.

limitations

ACOUSTONE Space Units are not recommended where subjected to impact, water immersion, splashing or condensation. They may be used under certain conditions of adverse temperature and humidity (contact your U.S.G. sales representative for accepta-

ACOUSTONE Space Units easily solve stubborn reverberation problems. Photos illustrate only two of numerous applications.

bility). Ceiling or overhead installation and adhesive attachment are not recommended where condensation is likely, such as in swimming pools and ice rinks. Adhesive attachment is for clean, firm surfaces only. Adhesive should *not* be applied to vinyl surfaces or to adhesively applied wall coverings.

installation

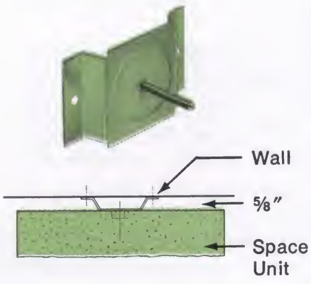
Spin-on Clip—This standard wall clip is suitable for Space Units centered not closer than 14″, or 7″ from any obstruction, to allow free rotation of the unit during installation. The wall clip with a stud attached is secured with two suitable fasteners. Each Space Unit has a nut embedded in the back and is turned clockwise on the stud until secure.

Snap-on Clip—This clip is used if Space Units are centered closer than 14″, or less than 7″ from obstructions; also used with concrete waffle slabs, intersecting walls or ceilings, columns and pilasters, or other close-quarter installations.

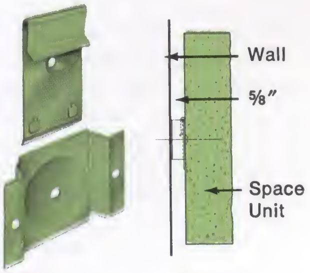
The wall clip is secured with two suitable fasteners and the supplementary Snap-on Clip is screw-attached to the Space Unit. The two clips are pressed together, first engaging Snap-on Clip's upper lip and then the lower.

Adhesive—For adhesive attachment, two ¾″-wide strips of pressure-sensitive DURABOND Space Unit Tape and one ½″ bead of DURABOND Space Unit Adhesive are field-applied to spacer block on the back of the Space Unit. This provides immediate, temporary fastening while the adhesive sets to provide permanent attachment to gypsum panels, sealed plaster, monolithic concrete or concrete block walls.

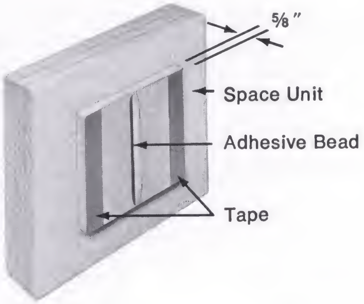
Spin-on Wall Clip



Snap-on Clip



Adhesive



AURATONE Panels and Tile . . . economical beauty in virtually every module

AURATONE Acoustical Panels and Tile are the result of a carefully controlled formulation that yields optimum balance between sound attenuation and sound absorption. They are made from prepared mineral fiber in a plant specially designed for this product. They include a high-density ¾" ceiling panel, with improved stability, absorption, attenuation and insulation values.

The AURATONE line includes both Regular and FIRECODE Panels and Tile (see table, page 5), in the patterns illustrated here; the tile in ½", ⅝" and ¾" thicknesses, 12"x12", 12"x24" and 24"x24" sizes; the lay-in panels in ⅝" and ¾" thicknesses, 24"x24" to 30"x60" sizes. The 24"x24" panel is available with the exclusive **Shadow Line** edge for recessed grid appearance. All patterns come with a washable, smooth white finish.

Also available are AURATONE FIRECODE HF Panels, designed for applications where high temperatures and humidity are likely to be encountered. They are provided in ¾" thickness, all standard panel sizes, and in Pin-Perforated, Nordic and Mecca patterns.

Fire Resistance—Meets Federal Spec. SS-S-118a, Type III, Class 25; Fire Hazard Classification (ASTM E84 test procedure): flame spread 25, fuel contributed 25, smoke developed 5. Fire ratings of 1 through 4 hours have been obtained for systems illustrated on pages 16 through 18.

Thermal Resistance (R)—Panels: 1.85 (⅝"); 2.18 (¾")
Tile: 1.85 (⅝"); 2.14 (¾")

installed resistance (1):	heat flow up	heat flow down
⅝" regular panels	3.90	4.60
⅝" FIRECODE panels	3.05	4.60
¾" regular panels	4.18	4.88
⅝" FIRECODE tile	3.50	4.20
¾" FIRECODE tile	3.80	4.50

(1) R-factors shown include "R" for inside air film and air space above installed ceiling unit.

Sound Ratings—The various AURATONE patterns range from .50 to .60 in NRC Average, and carry STC Ratings of 35 to 45 (see tables, pages 24 and 25). The ability to stop sound from passing through the ceiling material and back again into other occupied areas is one of the outstanding characteristics of AURATONE Panels. Major factors contributing to the high sound attenuation of AURATONE are the density and thickness of the panels.

Economy, Accessibility—AURATONE Panels are the wise choice for any application calling for maximum performance at minimum cost—plus easy access to service lines above the ceiling, through lay-in installation in exposed grids. AURATONE Tile edge designs accommodate spline suspension, recessed grid, stapling or adhesive attachment.

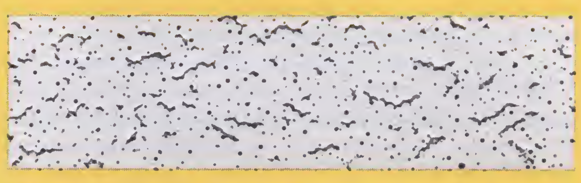
Light Reflectance—Grade LR 1.

Plastic Coating—All panel and tile patterns are available with the PC factory-applied plastic surface coating for vastly improved washability and reduced maintenance.

limitations

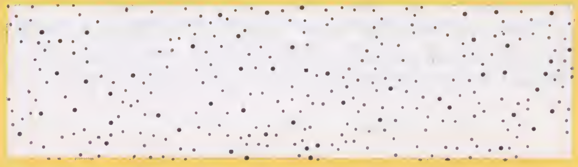
Although AURATONE FIRECODE HF Panels are exceptionally durable under severe temperature and humidity conditions, they must be handled and stored with a reasonable degree of protection, and used in applications where they are not saturated or heavily splashed with water, or subjected to continual condensation. To prevent objectionable sag, the weight of overlaid material such as insulation should be limited to a uniform load of 0.75 psf maximum. Such material nullifies the fire rating of AURATONE FIRECODE and AURATONE FIRECODE HF.

AURATONE patterns

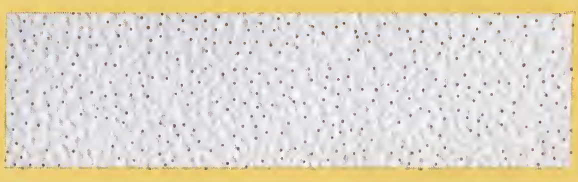


Fissured—Random fissuring, deeply etched below the planed surface, brings rugged beauty to any room.

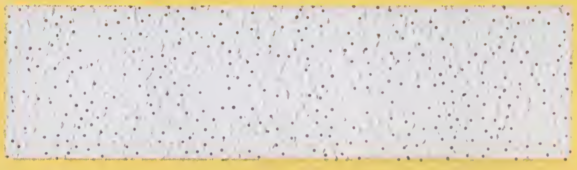
Filigree—A non-directional pattern appropriate for large installations in more formal settings.



Pin-Perforated—Bone white, unobtrusive random pattern with medium and small holes (1530 per sq. ft.) adds illusion of height.



Nordic—Acoustical efficiency by means of minute perforations, combined with eye-pleasing new riffled texture.



Mecca—Shallow-relief characters, reminiscent of ancient alphabets, provide subtle abstract geometric motif.

Reflected light and cheery color instill buying mood in customers, while Filigree pattern AURATONE Ceiling helps quiet the children. ▶

LORD & TAYLOR, Water Tower Place, Chicago, Ill.
Architect: LOEBL SCHLOSSMAN & HACKL

USG sound control ceilings

Special-Function AURATONE Panels and Tile . . .

AURATONE FIRECODE Panels and Tile are specially formulated to provide 1- to 4-hour fire protection when used in suspension systems tested by Underwriters Laboratories Inc.; yet they offer the same sound absorption, light reflectance and beauty as regular AURATONE Panels and Tile.

The following UL Designs offer a selection of exposed grid for lay-in applications, concealed Z-spline indirect-hung suspension and concealed accessible direct- or indirect-hung suspension. The concealed accessible suspension provides easy access to the plenum area above the ceiling for servicing electrical, heating and air conditioning installations. The Designs cover floor and roof constructions to meet virtually every building requirement.

AURATONE PC Panels and Tile are provided with a special factory-applied plastic coating which reduces ceiling maintenance where high soiling is anticipated.

Non-Standard Sizes of AURATONE products are available on special order within the following limits:

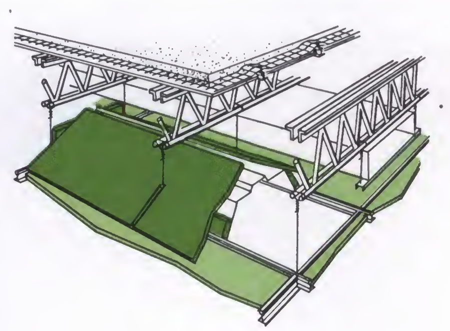
width	length
12″ to 30″	24″ to 60″

Consult local building officials for acceptance; UL label service not available for most non-standard sizes. Limits by product type may be obtained from U.S.G.

UL Designs for AURATONE products

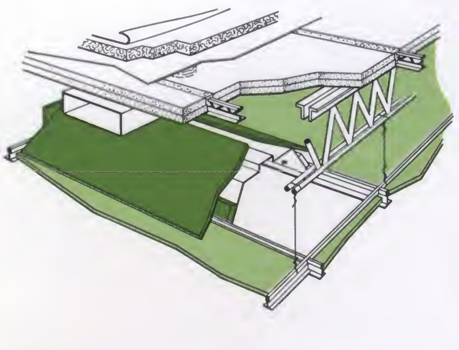
bar joist/poured gypsum deck

2-Hr. UL Design P207
(was RC-6-2 Hr.)
AURATONE FIRECODE Panels, ⅝″x24″x48″, laid on direct-hung exposed grid suspended from bar joists with 2″ gypsum roof deck poured on gypsum or mineral fiber formboard.†



bar joist/laminated gypsum deck

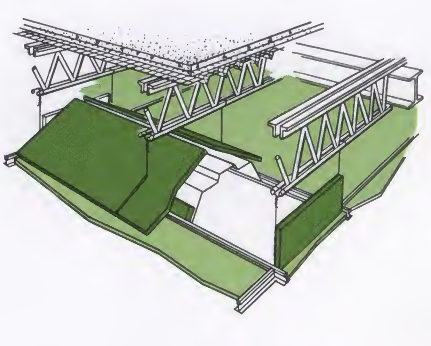
1½-Hr. UL Design P228
AURATONE FIRECODE PANELS, ⅝″x24″x 48″, laid on direct-hung exposed grid suspended from bar joists with 2″ SPAN-ROCK Gypsum Plank deck and 3½″ noncombustible insulation above.



bar joist/concrete deck on riblath

2-Hr. UL Design G231 (Beam 3 Hr.)
(was 299-2 Hr.)
AURATONE FIRECODE Panels, ¾″ thick, modules from 24″x24″ to 30″x60″, or 20″x60″, laid on direct-hung exposed grid suspended from bar joists with 2½″ concrete deck on metal lath above. Panels ⅝″ thick also qualify, except in 30″x60″ size.†

2-Hr. UL Designs G211 (was 72-2 Hr.) and **G227 (Beam 4 Hr.)** (was 226-2 Hr.)
AURATONE FIRECODE Panels, ⅝″x24″x48″ or 24″x24″, laid on direct-hung exposed grid suspended from bar joists with 2½″ concrete deck above. Shadow Line Panels approved for Design G227.†



2-Hr. UL Design G251
AURATONE FIRECODE Panels, ⅝″x24″x48″, laid on direct-hung grid suspended from bar joists, with 2½″ concrete deck above poured over metal lath.

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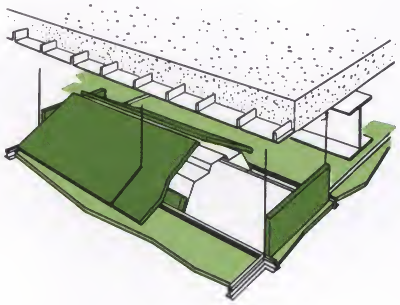
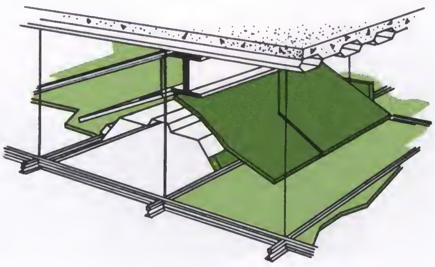
†AIRSON AURATONE FIRECODE Panels may be substituted.

steel frame, floor/concrete deck

4-Hr. UL Design D206 (Beam 4 Hr.)
(was 45-4 Hr.)
AURATONE FIRECODE Panels, ⅝"x24"x48", laid on direct-hung exposed grid suspended from steel floor and 2½" concrete deck above.

3-Hr. UL Design A207 (Beam 4 Hr.)
(was 65-3 Hr.)
AURATONE FIRECODE Panels, ⅝"x24"x48", laid on direct-hung exposed grid suspended from cellular steel floor and 2½" concrete deck above.†

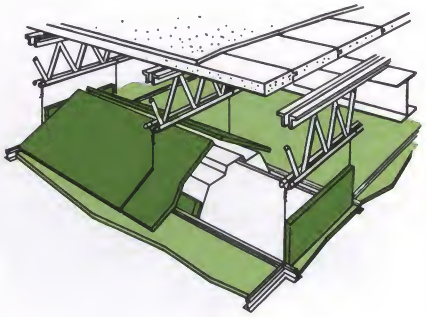




3-Hr. UL Design D207 (Beam 3 Hr.)
(was 226-3 Hr.)
AURATONE FIRECODE Panels, ⅝"x24"x48", laid on direct-hung exposed grid suspended from steel floor and 2¼" concrete deck above.

bar joist/gypsum plank floor

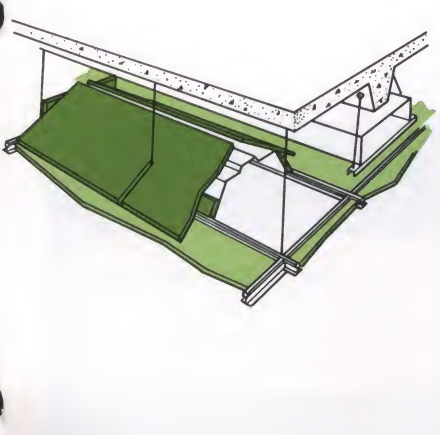
2-Hr. UL Design G230 (Beam 2 Hr.)
(was 293-2 Hr.)
AURATONE FIRECODE Panels, ⅝"x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from bar joists with USG Gypsum Floor Plank and ¾" MASTICAL Underlayment Compound above.



2-Hr. UL Design P213
(was RC-22-2 Hr.)
AURATONE FIRECODE Panels, ⅝"x24"x48", laid on direct-hung exposed grid suspended from bar joists with USG Gypsum Floor Plank above. (MASTICAL Underlayment not required.)

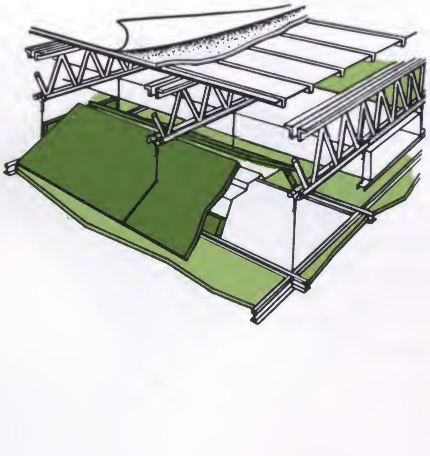
prestressed concrete T-beam/deck

2-Hr. UL Design J202
AURATONE FIRECODE Panels, ⅝"x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from prestressed concrete T-beam/deck.



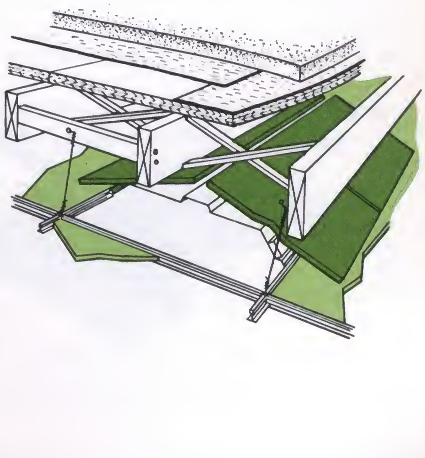
bar joist/steel roof deck

1-Hr. UL Design P214
(was RC-15-1 Hr.)
AURATONE FIRECODE Panels, ⅝"x24"x48", laid on direct-hung exposed grid suspended from bar joists with 1½" steel roof deck and 1" noncombustible insulation above.



wood joists & subfloor

1-Hr. UL Design L206
(was 31-1 Hr.)
AURATONE FIRECODE Panels, ⅝"x24"x48" or 24"x24", laid on direct-hung exposed grid suspended from 2x10 wood joists with 1" nom. wood floor or MASTICAL Floor Underlayment Compound above.

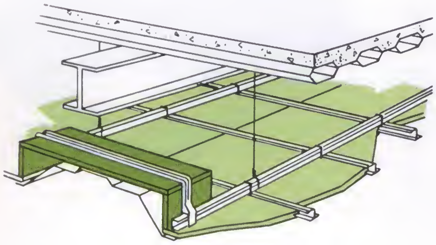


Special-Function AURATONE Panels and Tile *continued*

TILE

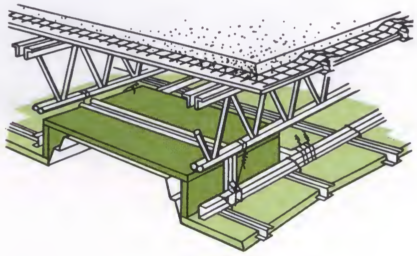
steel frame, floor/concrete deck

3-Hr. UL Design A009 (Beam 4 Hr.)
(was 59-3 Hr.)
AURATONE FIRECODE Tile, ¾″x12″x12″, suspended on concealed Z-spline system with cellular steel floor and 2½″ concrete deck above.†



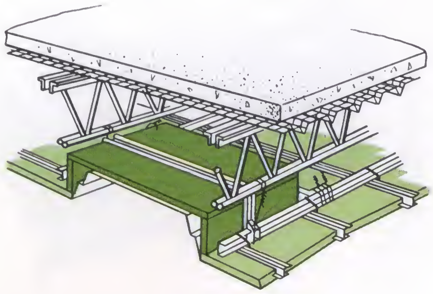
bar joist/poured gypsum deck

2-Hr. UL Design P002
(was RC-13-2 Hr.)
AURATONE FIRECODE Tile, ⅝″x12″x12″, suspended on concealed Z-spline system hung from bar joists with 2½″ gypsum roof deck poured on gypsum or mineral fiber formboard.†

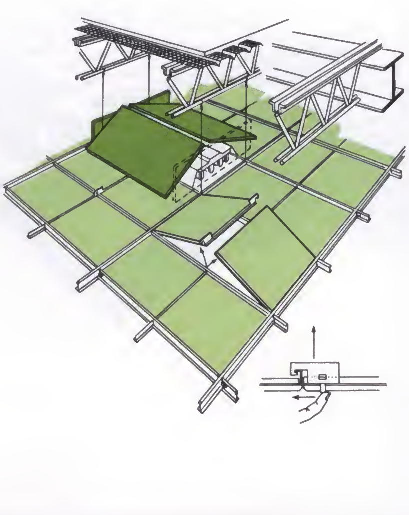


bar joist/concrete deck on riblath

2-Hr. UL Design G019
(was 84-2 Hr.)
AURATONE FIRECODE Tile, ⅝″x12″x12″, suspended on concealed Z-spline system hung from bar joists with 2½″ concrete deck on riblath above.†



2-Hr. UL Design G008 (Beam 2 Hr.)
(was 281-2 Hr.)
AURATONE FIRECODE Tile, ⅝″x12″x12″ or 24″x24″, suspended on concealed accessible grid system with 2½″ concrete deck on riblath over bar joists above.†



†AIRSON AURATONE FIRECODE Tile may be substituted.

VISTA SONIC Mirrored Ceiling Panels absorb sound, reflect images dramatically

Reflective ceiling of VISTA SONIC Panels increases sales receptiveness in an atmosphere of spaciousness.

Vista Sonic Mirrored Ceiling Panels are a new concept in reflective ceilings, designed as lightweight acoustical units suspended in standard exposed grid systems. They provide a unique combination of sound absorbency with distortion-free light reflection equal to costly front-surface glass mirrors, yet are safe and shatterproof. Vista Sonic Panels are available in silvered and in gold- or black-reflective tints to create dramatic decorative effects. They heighten visual space perception and multiply the impact of exhibitions and product displays, also deter pilfering in shops and stores.

These optically reflective panels are constructed from mineral acoustical board rigidly framed and covered with a tough resilient surface film stretched to form a 15/16″ thick mirrored assembly. The polyester film, .001″ thick, has an aluminized back surface that provides light reflection of optical clarity. The mirror is non-static which minimizes dust build-up and makes cleaning easier. A 1/8″ air space behind the film, created by the aluminum frame, allows the film to flex under minor impact without damage. The 5/8″ thick backing is composed of mineral-wool fibers and certain refractory materials water-felted to form acoustical units. The panel assembly is available in 24″x24″ and 24″x48″ sizes, square-edged for lay-in application.

Fire Resistance—Meets Federal Spec. SS-S-118a, Type IV, Class 25; Fire Hazard Classification (ASTM E84 test procedure): flame spread 10, fuel contributed 10, smoke developed 0.

Thermal Resistance (R)—1.85

installed resistance (1):	heat flow up	heat flow down
5/8″ metal suspension	3.90	4.60

(1) R-factors shown include "R" for inside air film and air space above installed ceiling unit.

Sound Ratings—Vista Sonic Panels are sound-absorbent, with an NRC range of .35-.45 (see table, page 24).

Economy, Accessibility—Vista Sonic Panels offer advantages over other types of reflective ceilings in two ways: (1) lower cost, (2) easy access to service lines above the ceiling, through lay-in installation.

Light Reflectance—Grade LR 1.

Maintenance—Slight dents and wrinkles from handling may be removed from the film with a hot-air blower of type used for hair styling, simply by directing the airstream at the panel until the wrinkles tighten.

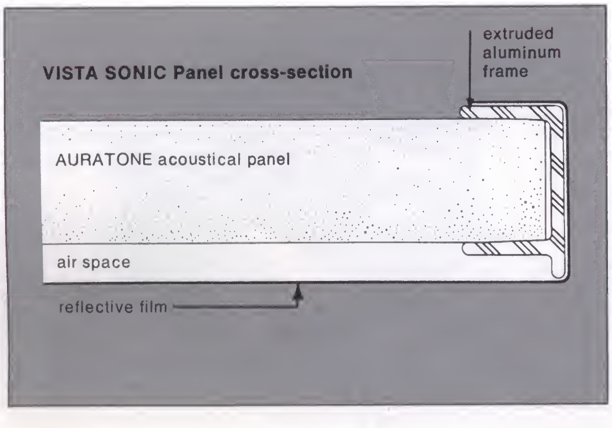
Cleaning is quickly done with soft cloth and household cleaners —for directions, see U.S.G. data sheet SC-835.

limitations

Installation should not be made: (a) where panels will be continuously exposed to high humidity (more than 80% RH); (b) below wainscot height or where exposed to impact, abrasion or tampering.

Film integrity must be preserved; panels must not be cut to partial size or to allow for sprinkler heads or lighting fixtures. Film should be protected from damage by sharp edges, abrasion or undue pressure.

To prevent objectionable sag, the weight of overlaid material such as insulation should be limited to a uniform load of 0.75 psf maximum.



VISTA SONIC Panel cross-section

USG Gypsum Ceiling Panels provide ideal exterior ceiling for drive-in bank canopy.

The NATIONAL BANK OF SOUTH CAROLINA, Columbia, S.C.
Architect: LA FAYE-LA FAYE & Assoc.

USG Gypsum Ceiling Panels . . . low-cost ceilings with 2-hr. fire rating

USG Gypsum Ceiling Panels are composed of noncombustible gypsum core with baked-on textured paint finish. They are produced in two formulations—exterior and interior—to provide attractive ceilings and soffits at economical cost while exhibiting superior fire resistance, high light reflectance and ease of maintenance. The textured panels (check with U.S.G. representative for pattern availability) are supplied ½" thick, in 24"x24" and 24"x48" sizes for suspension in exposed grid systems. Edges are square-cut for lay-in application. Light reflectance is Class LR 1 (ASTM C523 test procedure).

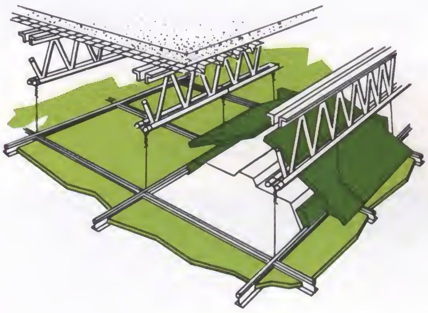
Fire Resistance—Fire Hazard Classification (ASTM E84 test procedure) of USG Gypsum Ceiling Panels: flame spread 25, fuel contributed 5, smoke developed 0. FIRECODE 24"x24" Panels qualify for 2-Hr. UL Design G222 (Beam 2 Hr.)

Sound Rating—When tested in exposed grid suspension system, continuous over partitions, USG Gypsum Ceiling Panels produced sound attenuation in the STC 40-44 range.

Economy, Accessibility—Panels provide total accessibility to service areas above at minimum cost for fire-rated construction.

Limitation—Not recommended where (a) sound absorption is required; (b) exposure to moisture is extreme or continuous; (c) directly exposed to weather or water. Cross-ventilation must be provided in unheated or enclosed space above ceiling panels. Support of overlaid insulation may cause excessive panel deflection, and is not recommended where high humidity conditions are likely to occur. Exterior suspension system should be approved for exterior use, by manufacturer.

2-Hr. UL Design G222 (Beam 2 Hr.)
(was 312-2 Hr.)
USG FIRECODE Gypsum Ceiling Panels, ½"x24"x24" laid on direct-hung exposed grid suspended from bar joists with 2½" concrete deck above.



ACOUSTISORBER Space Units, Panels and Screens . . . versatile, low-cost products for industrial noise control

For industrial buildings plagued with high noise levels, ACOUSTISORBER Noise Control Products can be the most effective yet economical remedy available. Used as part of an acoustical solution designed by qualified consultants, these versatile products can help reduce noise levels to conform with OSHA requirements. Installation is quick and simple, often done by plant personnel.

ACOUSTISORBER **Space Units, Panels** and **Screens** are modular and standardized, but have the sound performance versatility usually obtained only with expensive custom-fabricated units. In many cases one of these products can be used alone; in others they can be combined.

Space Units were developed to dampen reverberant sound energy resulting from a lack of adequate sound-absorptive surfaces. Designed for overhead suspension, they provide additional absorption to reduce reverberation and effectively control plant noise build-up.

Each unit, 20"x24" and 1 in. thick, is a mineral-fiber pad, metal-framed and plastic film-encased, for suspension from parallel wires. Quantities and spacing are calculated for each installation, and the units can be hung in an irregular pattern, if desired, to bypass overhead utilities.

Sound Absorption

ACOUSTISORBER Space Units

unit sound absorption(1)—sabins					
band center frequency—Hz					
125	250	500	1000	2000	4000
0.7	1.7	3.3	5.0	5.3	3.9

(1) As tested by Riverbank Acoustical Laboratories (test no. A-72-90), 20"x24" ACOUSTISORBER Space Units 1 ft. apart in rows 3 ft. o.c. For data on absorption and procedures for calculating units required, see U.S.G. literature jacket SC-850.

ACOUSTISORBER Panels

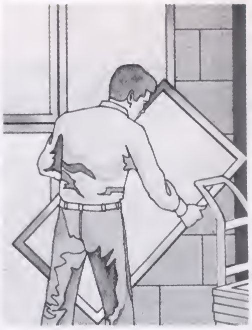
		sound absorption coefficients						
		band center frequency—Hz						
panel	mounting	125	250	500	1000	2000	4000	NRC
plain front face	flush	.29	.69	.99	.99	.86	.68	.90
	2" air space behind panel	.35	.76	.99	.99	.99	.72	.95
expanded-metal front face	flush	.35	.74	.99	.96	.85	.65	.90
	2" air space behind panel	.37	.85	.99	.99	.93	.68	.95

ACOUSTISORBER Screens

	sound absorption coefficients(2)						
	band center frequency—Hz						
screen	125	250	500	1000	2000	4000	NRC
expanded metal front face	.28	.70	.95	.89	.71	.61	.80

(2) Tested in accordance with ASTM C423-66. Mounting—laid on laboratory floor.

Space Units for sound absorption



Panels for acoustical wall treatment

Screens for area-isolation of sources

Noise Control Panels provide an NRC of .90 to .95 to absorb sound and reduce reverberation. They are lightweight, 2x4 ft. by 2 in. thick, and install on virtually any type of wall, normally without reinforcement. Installation can be permanent, or easily dismantled when the need arises.

The panels consist of mineral-fiber blankets encased in white plastic film, with a rigid, galvanized steel channel frame. High light reflectivity of the white panel face improves brightness levels. For applications where physical abuse is likely, aluminum expanded (and flattened) mesh is available on one side as optional protection. A double set of slots pre-punched in the frame provide for wall attachment with extruded aluminum clips, flush against the wall or projected for 2-in. clearance. Panels can be installed and removed individually, or ganged into larger areas. For details, see U.S.G. data sheet SC-851.

Noise Control Screens provide acoustical area-isolation of machinery and similar high-noise sources. Several facing options offer sound absorption, or absorption combined with attenuation.

Screens are similar to ACOUSTISORBER Panels except supplied in 8 or 12-ft. lengths. Depending upon performance requirements, they can be furnished with expanded metal mesh on one or both sides, or with 1/8" hardboard on one side for sound attenuation. These durable, versatile units are designed for use as (1) continuous perimeter screening, suspended from above or supported free-standing from the floor, or (2) surfacing for partial or complete enclosure of a noise source. For complete data, see U.S.G. data sheet SC-852.

Suspension can be on rollers or trolleys, to slide easily to one side for maintenance access to machinery. Free-standing floor supports and partial or complete enclosures can be built with channel framing supplied by United States Gypsum, or similar light steel framing. Available framing is detailed in U.S.G. data sheet SC-853.

limitations

ACOUSTISORBER Noise Control Products are not intended for use where temperature exceeds 150°F. They are designed as standardized noise-reduction modules only, not as a complete solution to any specific acoustical problem.

Sound Attenuation

ACOUSTISORBER Screens

floor-to-ceiling continuous screens(4)	sound transmission loss(3)—db																
	band center frequency—Hz																
	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	STC
joints unsealed	13	11	13	15	15	18	22	27	31	34	34	36	38	37	28	28	26
joints sealed	14	11	13	14	15	17	21	27	31	35	37	38	40	40	44	45	26

(3) Tested in accordance with ASTM E336-71. Note that while STC remains the same, high-frequency performance is improved by sealing joints between adjacent screens with USG Acoustical Sealant.
(4) Standard white plastic front face, 1/8" hardboard back face (away from sound source).

AIRSON Air Distribution Systems . . . optimum answer to constant comfort

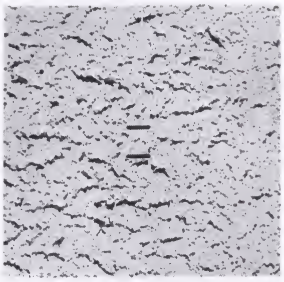
Acoustone Tile and Auratone Panels and Tile are supplied in four types and four popular patterns for use in the **Airson Ceiling Air Distribution System.** This system, with millions of square feet in use, employs openings in the tile or grid to distribute a wall-to-wall flow of heated or cooled air into a room. Unlike traditional methods of air distribution, the Airson Tile or Panel System is not dependent upon a costly and complicated system of air supply ducts and diffusers. Instead, it utilizes the plenum area above the ceiling to carry conditioned air to the room through individual tile or grid orifices. The continuous, uninterrupted beauty of the ceiling is preserved, as all visible diffusers are eliminated.

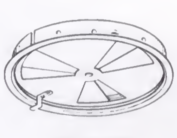
In the standard Airson Tile System, movable slides on the backs of the tiles (easily adjustable from below) act like small dampers to control the volume of air. Since each tile or panel is individually adjustable, the area can be zoned and balanced for comfort. The ceiling surface is installed on concealed Z-splines or exposed grid—either with all of the tile in the ceiling slotted to provide jets, or with a percentage of tile unslotted.

The Acoustone and Auratone products used are specially designed for use with the Airson system. The bright, non-breathing, foil-back surface prevents seepage of air through the field of the tile and provides reflective insulation in the plenum space. The selection consists of ¾″ Acoustone, either the regular or fire-rated version, in **Fissured** and **Glacier** patterns, 12″x12″, 12″x24″ and 24″x24″ sizes; ⅝″ Auratone Panels, regular or Firecode, 24″x24″ to 30″x60″ sizes, and **⅝″** or **¾″ Auratone Firecode** Tile, 12″x12″ to 24″x24″ size—in **Fissured** pattern. All are available plastic-coated if desired.

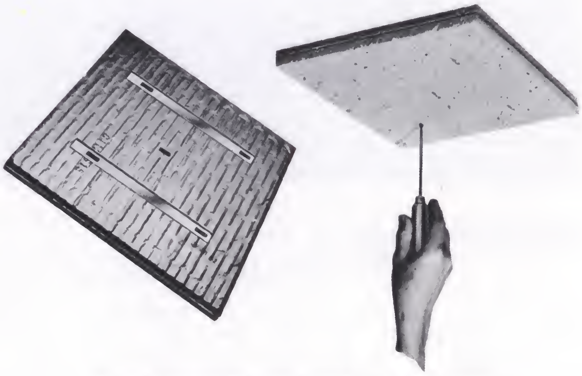
Two jet arrangements are offered: **A-2,** with two orifices per tile, and **A-5,** with five orifices placed parallel with the fissures of the tile. The A-2 orifice arrangement gives a 35% deeper penetration than A-5 at the same flow conditions, making it more suitable for high ceiling-low flow applications. Both have been proven by test far superior in penetration to ordinary perforated ventilating tile. For added flexibility, Airson Auratone Panels may be furnished with either 25%, 50% or 100% slotting. A third type of tile available is **unslotted.**

In addition to the slotted tile suspension, special grid systems are used with unslotted panels and tile. These are the steel **Airflo T-2 Grid** and **T-4 Grid** in which air distribution is accomplished through orifices at 2″ intervals in the face of the tee. Both systems include complete metal accessories: slides, splines, mouldings, runners, spot jets, clips.

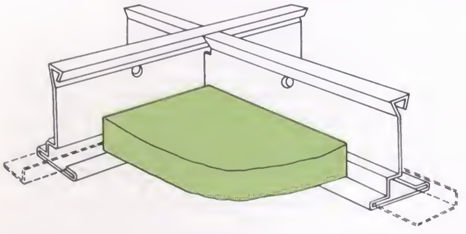

AIRSON ACOUSTONE A-2 Tile

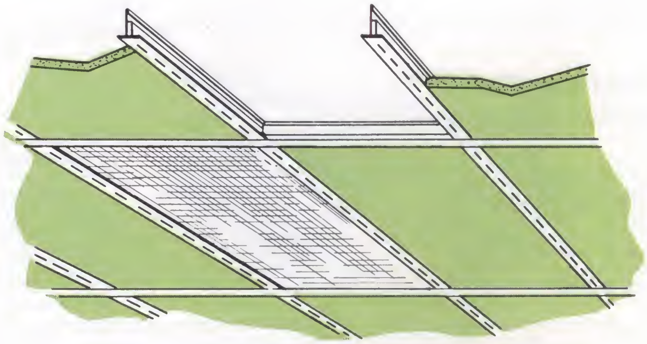

Spot Jet

Top and bottom views of AIRSON ACOUSTONE A-5 tile (below) show foil and adjustable slides located on back of unit, and adjustment from face of unit made easily with ordinary ice pick for air flow control.



In the AIRSON AURATONE A-2 panel (below), adjustable damper slides on back provide control of air without removing the panel.


AIRFLO T-4 Grid


AIRFLO T-2 Grid

USG sound control ceilings

Classroom ceiling of Fissured AURATONE Panels uses the AIRFLO T-4 Grid System to distribute air evenly and quietly.

ANOKA SENIOR HIGH SCHOOL, Anoka, Minn.
Architect: ARMSTRONG, SCHLICHTING, TORSETH & SKOLD, Inc.

Elegance and comfort are combined in Glacier AIRSON ACOUSTONE Tile slotted A-2 in this architectural office.

VOSBECK, VOSBECK, KENDRICK, REDINGER Offices, Alexandria, Va.
Architect: VOSBECK, VOSBECK, KENDRICK, REDINGER

sound absorption/flame resistance/light reflection‡

product	thickness	mounting	sound absorption coefficients band center frequency—Hz						NRC range	light refl. coeff.	flame resistance SS-S-118a class	flame spread E84 index	unit size tested
			125	250	500	1000	2000	4000					
ACOUSTONE Tile													
“F” Fissured	¾″	1	.09	.26	.79	.97	.84	.91	.65-.75	.84	25	15	12″x12″
		7	.58	.62	.58	.79	.94	.97	.70-.80	.84	25	15	12″x12″
Glacier	¾″	7	.61	.63	.58	.78	.86	.97	.65-.75	.67	25	15	12″x12″
Finesse	¾″	7	.48	.53	.55	.77	.85	.83	.65-.75	.76	25	15	12″x12″
Seacrest	¾″	7	.34	.34	.69	.93	.98	.99	.70-.80	.63	25	15	24″x24″
Foil-Backed ACOUSTONE Tile and Panels													
Fissured	¾″	7	.45	.46	.62	.91	.96	.98	.70-.80	.84	25	15	12″x12″
Glacier	¾″	7	.45	.41	.61	.87	.85	.87	.65-.75	.68	25	15	12″x12″
		7	.28	.25	.53	.93	.97	.93	.60-.70	.66	25	15	24″x48″
Boulder	¾″	7	.32	.31	.58	.83	.88	.91	.60-.70	.59	25	15	24″x48″
Butte	¾″	7	.33	.30	.58	.91	.94	.88	.65-.75	.72	25	15	24″x48″
ACOUSTONE FIRECODE Fissured (5)	¾″	7	.52	.50	.60	.95	.99	.97	.70-.80	.76	25	15	12″x12″
ACOUSTONE “PC” Fissured	¾″	1	.22	.21	.78	.99	.78	.59	.65-.75	.85	25	15	12″x12″
		7	.70	.63	.67	.82	.86	.62	.70-.80	.85	25	15	12″x12″
MOTIF'D ACOUSTONE Striated	¾″	1	.03	.26	.77	.93	.83	.78	.65-.75	.66	25	15	12″x12″
		7	.47	.63	.57	.72	.81	.86	.65-.75	.66	25	15	12″x12″
Foil-Backed MOTIF'D ACOUSTONE Galaxy	¾″	7	.58	.46	.69	.91	.80	.76	.65-.75	.79	25	15	12″x12″
AIRSON ACOUSTONE “A-2” Fissured, slotted (1)	¾″	7	.85	.49	.68	.98	.92	.88	.70-.80	.79	25	15	12″x12″
AIRSON ACOUSTONE “A-5” Fissured, slotted (2)	¾″	7	.81	.48	.65	.94	.93	.84	.70-.80	.80	25	15	12″x12″
AURATONE Panels													
Fissured	⅝″	7	.27	.30	.55	.69	.58	.54	.50-.60	.77	25	25	24″x48″
	¾″	7	.29	.34	.66	.74	.59	.56	.55-.65	.77	25	25	24″x48″
Filigree	⅝″	7	.27	.30	.51	.66	.62	.53	.45-.55	.84	25	25	24″x48″
	¾″	7	.32	.34	.67	.75	.59	.55	.55-.65	.84	25	25	24″x48″
Pin-Perforated	⅝″	7	.27	.31	.54	.65	.51	.40	.45-.55	.81	25	25	24″x48″
Nordic	⅝″	7	.34	.39	.63	.78	.51	.38	.55-.65	.81	25	25	24″x48″
AURATONE FIRECODE Panels													
Fissured	⅝″	7	.32	.31	.61	.74	.72	.43	.55-.65	.79	25	25	24″x48″
Filigree	⅝″	7	.30	.30	.58	.76	.55	.45	.50-.60	.79	25	25	24″x48″
Pin-Perforated	⅝″	7	.30	.30	.57	.73	.58	.46	.50-.60	.83	25	25	24″x48″
Mecca	⅝″	7	.31	.32	.61	.71	.46	.34	.50-.60	.83	25	25	24″x48″
AURATONE Tile													
Fissured	⅝″	7	.41	.32	.53	.81	.66	.51	.55-.65	.83	25	25	12″x12″
	¾″	7	.40	.34	.60	.79	.64	.53	.55-.65	.84	25	25	12″x12″
Filigree	⅝″	7	.42	.32	.52	.85	.68	.53	.55-.65	.82	25	25	12″x12″
	¾″	7	.40	.36	.43	.80	.62	.56	.50-.60	.82	25	25	12″x12″
Pin-Perforated	⅝″	7	.39	.33	.52	.76	.65	.49	.50-.60	.85	25	25	12″x12″
Mecca	⅝″	1	.39	.32	.54	.82	.63	.44	.55-.65	.86	25	25	12″x12″
AURATONE FIRECODE Tile													
Fissured	⅝″	7	.41	.33	.53	.82	.67	.62	.55-.65	.81	25	25	12″x12″
	¾″	7	.38	.34	.60	.84	.65	.56	.55-.65	.83	25	25	12″x12″
Filigree	⅝″	7	.43	.35	.56	.81	.67	.64	.55-.65	.82	25	25	12″x12″
VISTA SONIC Mirrored Panels	⅝″	7	.32	.28	.35	.42	.46	.61	.35-.45	.85	25	10	24″x24″

‡All surfaces tested were painted. Mounting No. 1—adhesive application to gypsum board. Mounting No. 2—stapling or nailing to wood strips. Mounting No. 7—metal suspension system. Federal Specification SS-S-118a Light Reflection Grade designations include coefficients as follows: LR 1—0.75 or greater; LR 2—0.70-0.74; LR 3—0.65-0.69; LR 4—.60-.64. Also see Footnotes, page 25.

sound attenuation properties

product	thick-ness	mount-ing	sound attenuation factors—db																	unit size tested
			band center frequency—Hz																	
			125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	STC	
ACOUSTONE Tile																				
Fissured	¾″	Ad(3)	37	44	46	43	48	52	53	51	52	57	60	>60	>60	>60	>60	>60	55-60	12″x12″
		ICF	29	37	34	27	27	28	30	31	32	34	38	44	50	56	58	59	35-39	12″x12″
Glacier	¾″	CCF	28	32	32	23	22	23	23	22	24	25	27	30	33	35	38	42	25-29	12″x12″
Finesse	¾″	ICF	29	36	34	26	25	27	28	27	28	29	32	36	39	43	48	52	30-34	12″x12″
Foil-Backed ACOUSTONE Tile and Panels																				
Fissured	¾″	IET	29	38	36	29	30	33	34	34	36	39	43	46	51	54	54	56	35-39	12″x24″
		CE(4)	27	34	36	29	30	34	36	40	40	42	44	43	44	44	46	47	40-44	24″x24″
Glacier	¾″	CCF	30	35	37	32	32	35	36	37	39	40	42	45	50	52	54	56	40-44	12″x12″
		CE(4)	24	32	31	25	26	29	31	34	35	37	37	39	42	41	43	46	35-39	24″x48″
Seacrest	¾″	CE	28	34	35	29	29	32	33	37	39	40	40	44	45	45	46	47	35-39	24″x24″
Boulder	¾″	CE(4)	27	31	32	26	27	30	32	34	36	37	39	40	42	41	41	42	35-39	24″x48″
Butte	¾″	CE(4)	28	33	32	26	28	30	31	36	37	37	39	39	42	41	42	44	35-39	24″x48″
ACOUSTONE FIRECODE Tile Fissured (5)	¾″	ICX	32	39	38	32	32	36	38	38	40	44	46	52	56	>60	>60	>60	40-44	12″x12″
AIRSON ACOUSTONE Tile Fissured, 50% A-5	¾″	ICF	28	34	33	26	26	29	30	31	33	36	40	45	49	52	52	55	35-39	12″x12″
AURATONE Panels																				
Fissured	⅝″	CE	31	38	36	29	30	34	34	37	40	43	47	50	54	56	55	57	40-44	24″x48″
	¾″	CE	33	38	37	30	31	33	35	38	41	46	49	54	57	56	57	59	40-44	24″x48″
		CEa	34	43	40	31	34	39	44	50	55	60	>60	>60	>60	>60	>60	>60	45-49	24″x48″
	⅝″	CEa	29	38	39	32	32	39	44	49	54	60	60	60	60	60	60	60	40-44	24″x48″
		CEd	29	38	39	36	41	45	50	54	58	60	60	60	60	60	60	60	45-49	24″x48″
Filigree	⅝″	CE(4)	31	37	37	31	32	35	36	41	42	44	48	50	53	54	53	55	40-44	24″x48″
	¾″	CE	35	37	36	31	31	34	36	39	42	46	50	52	58	57	57	60	40-44	24″x48″
Pin-Perforated	⅝″	CE	32	35	35	28	30	32	33	37	40	43	47	51	53	54	54	55	40-44	24″x48″
	¾″	CE	31	40	39	31	30	34	36	40	44	49	53	56	58	58	58	>60	40-44	24″x48″
Nordic	⅝″	CE	28	35	35	26	26	29	29	32	34	36	41	46	50	50	51	53	35-39	24″x48″
AURATONE FIRECODE Panels																				
Fissured	⅝″	CE	33	38	38	33	33	37	39	41	44	48	49	53	55	55	55	56	40-44	24″x48″
Filigree	⅝″	CE	32	37	40	33	33	36	38	40	43	48	51	53	55	56	55	57	40-44	24″x48″
Pin-Perforated	⅝″	CE	31	38	39	33	33	38	40	42	44	48	50	53	55	56	56	57	45-49	24″x48″
Mecca	⅝″	CE	31	36	37	32	32	35	39	40	44	48	49	53	55	55	54	56	40-44	24″x48″
AURATONE Tile																				
Fissured	⅝″	CCF	33	35	38	32	33	39	38	41	44	47	49	54	55	56	57	60	40-44	12″x12″
	¾″	CCF	31	36	39	33	35	38	40	44	47	51	52	56	57	55	55	58	45-49	12″x12″
Filigree	⅝″	CCF	31	33	36	31	33	37	36	39	41	44	48	53	55	55	54	58	40-44	12″x12″
	¾″	CCF	32	35	38	34	34	39	40	43	46	50	52	55	57	56	54	58	45-49	12″x12″
Pin-Perforated	⅝″	CCF	31	34	37	32	33	38	38	41	44	47	50	55	56	56	56	59	40-44	12″x12″
Mecca	⅝″	CCF	28	34	38	31	34	37	38	40	43	47	50	55	57	55	58	60	40-44	12″x12″
AURATONE FIRECODE Tile																				
Fissured	⅝″	CCF	29	34	38	32	32	34	35	37	38	41	46	51	54	55	56	60	40-44	12″x12″
	¾″	CCF	30	38	40	35	36	40	41	42	46	49	52	55	57	55	55	58	45-49	12″x12″
Filigree	⅝″	CCF	30	35	36	30	30	32	34	36	40	41	46	52	55	54	55	60	40-44	12″x12″
USG Gypsum Ceiling Panels	½″	CE	34	40	41	34	36	40	41	42	44	46	47	48	48	44	41	41	40-44	24″x48″
	⅝″	CE	33	42	43	37	38	42	43	45	46	47	47	48	46	44	43	42	40-44	24″x24″

NOTE: All test results shown are from independent recognized laboratories; all surfaces tested were painted. Abbreviations, mountings: ICX—concealed suspension system, interrupted at partitions, but with accessible feature; Ad—adhesively attached; IE—exposed suspension system, interrupted at partitions; IET—same as IE but with concealed tees supporting tile in one direction; CE—exposed suspension system, continuous at partitions; ICF—concealed suspension system, interrupted at partitions, flat splines; CCF—concealed suspension system, continuous at partitions, flat splines; CCT—same as CCF, except with tee splines; CEa—same as CE, but with one layer 1½″ Sound Attenuation Blanket placed above ceiling, continuous; CEd—same as CE, but with two layers 1½″ Sound Attenuation Blankets placed above ceiling, 4 ft. in each direction from partition. See also Footnotes below.

(1) Tile penetrated with two slots for AIRSON Tile Air Distribution System. (2) Tile penetrated with five slots for AIRSON Tile Air Distribution System. (3) Tile adhesively attached to ½″ gypsum panels screw-attached to indirect-hung suspension. (4) Suspended on exposed T-grid. Tile is face-rabbeted on four edges. (5) Formerly ACOUSTONE "120".

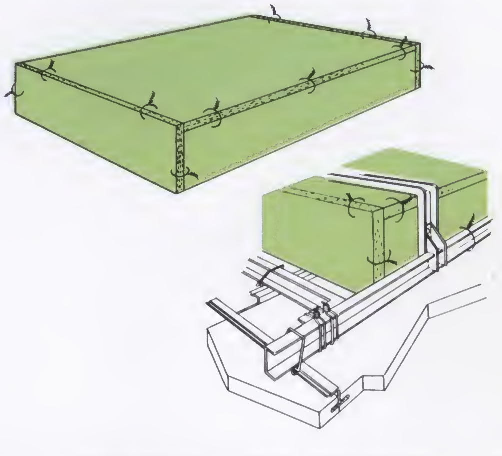
Non-Acoustical Ceiling Materials . . . for specialized applications

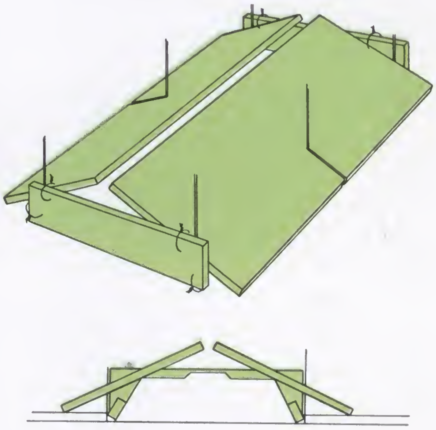
USG Asbestos Board, 3/16″ thick in nom. 24″x24″ and 24″x48″ sizes, is supplied either Perforated or Unperforated, for lay-in use in ceiling grid systems. Square-edged or beveled (1/16″ bevel on all four sides). Perforations, .197″ dia., are spaced ½″ o.c. White Rippletone texture finish. For other data, see table on page 5.

Other tile bases, where a fire-resistant base for adhesive application of ceiling tile is required, include SHEETROCK and SHEETROCK FIRECODE Gypsum Panels, and ROCKLATH Plaster Base. See U.S.G. folders SA-917, SA-927.

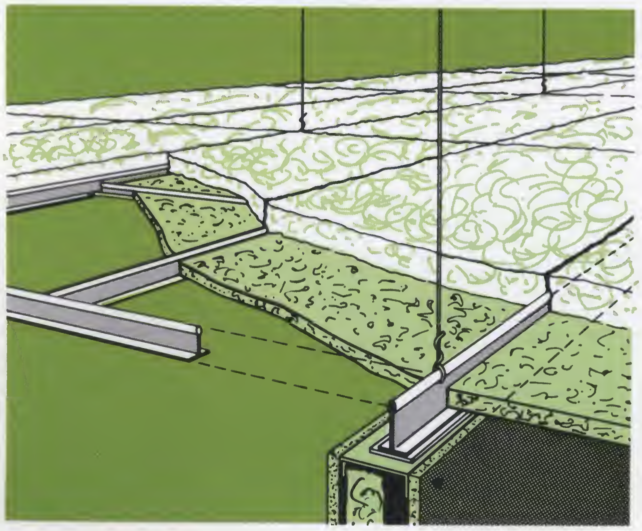
THERMAFIBER Light Fixture Protection brings packaged convenience to jobs using U.S.G. ceiling systems, whether panel or tile. This consists of 1¼″ thick semi-rigid mineral wool board wire-tied and suspended over fixtures. The assemblies (illustrated right) carry UL Labels covering board module ceiling designs of 1, 1½, 2, 3 and 4 hours for which ratings have been established. They are adaptable to acoustical tile and panel ceiling constructions using either an exposed grid or concealed Z-spline suspension.

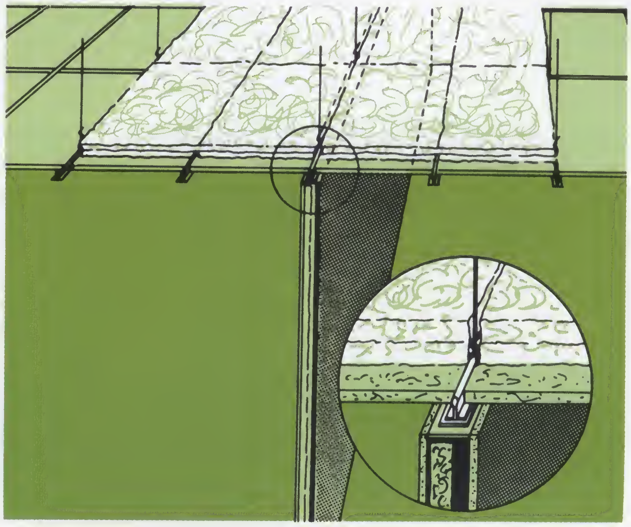
The THERMAFIBER Light Fixture Protection package is shipped in one module for panels, and in three for tile.


box assembly with concealed Z-spline suspension


tent assembly with exposed grid

Wool-backed Panel Systems


Mounting CEa—Sound Attenuation Blankets over entire ceiling —using ¾″ AURATONE Fissured Panels—STC 45-49 (see 16-freq. test listing, page 25)


Mounting CEd—Double-layer Blankets 4 ft. each side of partition —using ⅝″ AURATONE Fissured Panels—STC 45-49 (see 16-freq. test listing, page 25)

specifications

notes to architect

1. Many qualified acoustical contractors will arrange for job layouts and detailing; however, architects may prefer to furnish the layouts.

2. U.S.G. acoustical products, except Auratone Firecode HF, are designed for installation and use under standard occupancy conditions at no more than 80% RH.

3. The roof deck above U.S.G. acoustical ceiling products must be properly insulated and incorporate a vapor barrier to prevent condensation and staining of the ceiling. Insulation blankets can be overlaid on ceiling (max. ¾ psf to prevent sag), but ventilation above must be adequate; also, access is difficult and any fire rating is voided.

4. Critical lighting (strong sidelighting with slight angle of incidence to ceiling surface, greatly exaggerating surface irregularities) demands careful, precise installation to avoid job problems and owner complaints; therefore, should be avoided if possible. Effects can be minimized by using beveled-edge or rough-surfaced patterns in lieu of smooth-surfaced or square-edge units, or by employing exposed suspension. Shadows often can be eliminated or reduced with draperies or blinds.

5. Because acoustical ceiling materials are fragile, rough handling can easily chip edges or break units. Cartons never should be used as scaffolding or a ladder.

6. Concealed spline systems present the most nearly monolithic ceiling appearance. Four-sided spline support levels the tile, acts as an air seal. These systems provide slight adjustment to compensate for job inaccuracies. They can provide accessibility above, but square-edge tile is not recommended for frequent removal.

7. Exposed grid systems with lay-in panels provide access above the ceiling, and a choice of surface treatment with various edge configurations; square edge or flush installation, Shadow Line or Accent Edge for recessed-grid effect. For fire-rated and exterior applications, only suspension systems so rated may be used.

8. General cleaning maintenance, for loose dust, is handled with a soft brush or vacuum cleaner. Brushing should be light and in only one direction. Small marks and smudges can usually be removed with "art gum" erasers. New wallpaper cleaner is often used for larger soiled areas. For small nicks and chips a small amount of paint, chalk or pastel of matching color is excellent for hiding and "filling." For the white color, typists' correction fluid, or shoe polish is satisfactory. A trial should first be made on a scrap tile.

9. Soiled acoustical tile and panels can be washed with mild soapsuds, but not detergent, and should never be soaked or immersed. A soft washcloth, soaked and wrung dry is best, both for washing lightly and for clear-water rinse. Adhesively applied tile should not be washed sooner than 4 hrs. after application.

10. Ceiling units can be repainted without loss of acoustical properties if a thin, non-bridging paint (such as Tal Latex Wall Paint from U.S.G.) is used. "PC" plastic-coated tile/panels should be repainted with a semi-gloss enamel (such as Grand Prize Latex Semi-Gloss from U.S.G.) to retain the original semi-gloss appearance. Paint should be chosen also for good hiding power. Spraying is preferable, but Acoustone Products and USG Gypsum Ceiling Panels can also be brush- or roller-painted. If possible, units to be painted should be removed from ceiling.

11. Variations in color and fissure size in acoustical ceiling products are natural; they are of small consequence within a batch, but more obvious from batch-to-batch. Jobs should be planned so that material is ordered and shipped at one time.

Part 1: general

1.1 scope—*Specify areas to receive this acoustical treatment.*

1.1.1 work included (Airson)—Airson Air Distribution System including acoustical material and suspension system, zoning and sealing of plenum space.

1.1.2 work by others (Airson)—Heating and cooling plants including ductwork to plenum zones, wall and ceiling return-air grilles, auxiliary heating and cooling units, electrical fixtures and other equipment to be incorporated in the ceiling suspension systems. All overhead architectural, mechanical, and electrical work shall be completed prior to installation of the system.

1.2 qualifications

Construction conditions shall comply with ASTM C636.
Acoustical material and suspension systems, including necessary hangers, grillage, splines, and other supporting hardware, shall be furnished and installed by a qualified contractor.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises. Immediately prior to installation, tile and panels shall be stored for a sufficient time to stabilize at temperature and humidity conditions ambient during installation, and anticipated during occupancy.

1.4 environmental conditions

Installation of (acoustical tile or panels shall not begin until building is enclosed, permanent heating and cooling equipment in operation, and residual moisture from plaster, concrete or terrazzo work dissipated.) (USG Exterior Gypsum Panels shall not begin until protection from direct exposure to water and weather has been provided.)

1.5 design conditions

System shall be rated NRC ( ) in accordance with ASTM C423 and STC ( ) in accordance with AMA1-II as tested by an independent agency.

Part 2: products

2.1 materials

2.1.1 Acoustone Mineral Acoustical (Tile) (Panels) by United States Gypsum, (Glacier) (Fissured) (Finesse) (Seacrest) (Domino) (Boulder) (Butte) pattern, ( ) color, ¾″ thick, (length x width), (bevel) (square) (Shadow Line) (Accent) edge, molded mineral fiber units having natural fissured surface, 18 pcf min. density, (with non-breathing factory-applied aluminum foil backing,) (factory-applied acrylic plastic surface coating).

2.1.2 Motif'd Acoustone Mineral Acoustical Tile by United States Gypsum, (Georgian) (Striated) (Fantasia) (Galaxy) (Custom) pattern, ( ) color, ¾″ thick, 12″x12″, square edge, molded mineral fiber units having natural fissured surface patterned by brushing, 18 pcf min. density, (with non-breathing factory-applied aluminum foil backing) (factory-applied acrylic plastic surface coating).

2.1.3 Acoustone Firecode Mineral Acoustical (Tile) (Panels) by United States Gypsum, approved for UL Design No. ( ), ( ) pattern, ( ) color, ¾″ thick, (12″x12″) (24″x24″), (square) (bevel) (Shadow Line) (Accent) edge, 18 pcf min. density, (factory-applied acrylic plastic surface coating).

2.1.4 Airson Acoustone Firecode Mineral Acoustical Tile by United States Gypsum, (approved for UL Design No. ( ),) (Fissured) (Glacier) pattern, ( ) color, ¾″ thick, (length x width), (square) (bevel) edge, ( )% A-2 slotted, ( )% A-5 slotted, ( )% unslotted, factory-applied non-breathing aluminum foil backing, 18 pcf min. density, (factory-applied acrylic plastic surface coating).

2.1.5 Acoustone Mineral Acoustical Space Units by United States Gypsum, (Finesse) (Glacier) pattern, white color, 2¼″ thick, 10½″x10½″, 18 pcf min. density.

2.1.6 Auratone Acoustical Tile by United States Gypsum, (Pin-Perforated) (Fissured) (Filigree) (Nordic) (Mecca) pattern, (½″) (⅝″) (¾″) thick, (length x width), (staple flange) (butt bevel) (bevel with kerf) (24″x24″ Shadow Line) edge, mineral fiber ceiling tile, (factory-applied acrylic plastic surface coating).

2.1.7 Auratone Acoustical Panels by United States Gypsum, (Pin-Perforated) (Fissured) (Filigree) (Nordic) (Mecca) pattern, (⅝″) (¾″) thick, (length x width), mineral fiber ceiling panels, (factory-applied acrylic plastic surface coating).

2.1.8 Auratone Firecode Acoustical Tile by United States Gypsum, approved for UL Design No. ( ), (Fissured) (Filigree) (Pin-Perforated) (Nordic) (Mecca) pattern (⅝″) (¾″) thick, (12″x12″) (12″x24″) (24″x24″), (tongue & groove) (bevel) (square) edge, (factory-applied acrylic plastic surface coating).

2.1.9 Auratone Firecode Acoustical Panels by United States Gypsum, approved for UL Design No. ( ), (Fissured) (Filigree) (Pin-Perforated) (Nordic) (Mecca) pattern, ⅝″ thick, (length x width), (factory-applied acrylic plastic surface coating).

2.1.10 Auratone Firecode HF Acoustical Panels by United States Gypsum, approved for UL Design No. ( ), capable of withstanding temperature-humidity extremes, (Pin-Perforated) (Nordic) (Mecca) pattern, ¾″ thick, (length x width), (factory-applied acrylic plastic coating).

2.1.11 Airson Auratone Firecode Acoustical Panels by United States Gypsum, approved for UL Design No. ( ), (Fissured) (Filigree) (Pin-Perforated) (Nordic) (Mecca) pattern, ⅝″ thick, 24″x (24″) (36″) (48″) (60″), mineral fiber ceiling panels, ( )% A-2 slotted, ( )% A-5 slotted, ( )% unslotted (factory-applied acrylic plastic surface coating).

2.1.12 Airson Auratone Firecode Acoustical Tile by United States Gypsum, approved for UL Design No. ( ), (Fissured) (Filigree) (Pin-Perforated) (Nordic) (Mecca) pattern, (⅝″) (¾″) thick, (12″x12″) (24″x24″), (bevel) (tongue and groove) edge, mineral fiber ceiling tile, ( )% A-2 slotted, ( )% A-5 slotted, ( )% unslotted, (factory-applied acrylic plastic surface coating).

2.1.13 Vista Sonic Mirrored Ceiling Panels by United States Gypsum, 15/16″ thick, (24″x24″) (24″x48″), tinted (silver) (gold) (black)-reflective.

2.1.14 USG (Firecode) Interior Gypsum Ceiling Panels by United States Gypsum, (approved for UL Design No. G222,) ( ) pattern nom. ½″ thick, (24″x24″) (24″x48″).

2.1.15 USG Exterior Gypsum Ceiling Panels by United States Gypsum, ( ) pattern, nom. ½″ thick, (24″x24″) (24″x48″).

2.1.16 Thermafiber Light Fixture Protection by United States Gypsum, approved for UL Design No. ( ), (box) (tent) type assembly, nom. 1¼″ thick, semi-rigid mineral fiber board.

2.1.17 fire-rated suspension—Per UL Design No. ( ) and ASTM C635.

2.1.18 concealed spline suspension—commercially available system meeting standards of ASTM C635, runners attached to 1½″ channel grillage. Flat metal splines engage adjacent tile.

2.1.19 one-way exposed spline suspension (48″)—Commercially available suspension system meeting "intermediate" (or better) structural standards of ASTM C635, having main member exposed, supporting acoustical tile on all four sides using appropriate angle or tee splines between adjacent tile.

2.1.20 exposed grid (Shadow Line) (Accent Edge) suspension—Inverted tee, direct hung system meeting "intermediate" (or better) structural standards of ASTM C635.

2.1.21 concealed accessible (shiplap) spline suspension—1¼″ Z-spline spaced 24″ o.c., attached to 1½″ channel grillage. Back-to-back angle splines engage adjacent tile to provide (specify %) accessibility to plenum. Tee and angle splines support remaining tile.

Part 3: execution

3.1 suspended—Install acoustical material and suspension system, including necessary hangers, grillage, splines and other hardware supporting the acoustical material in accordance with UL Design No. ( ) and ASTM C636.

3.2 fissured tile—Intermix tiles from four or more cartons to obtain uniform distribution of fissure variations.

3.3 adhesive—Apply acoustical material, using an adhesive manufactured specifically for applying acoustical tile, in accordance with adhesive manufacturer's directions. Insert fiber splines in kerfs at corners of units.

3.4 Acoustone Space Units

a. clip attachment—Install Space Units with Wall Clips attached with suitable fasteners to wall or ceiling. Attach Snap-on Clip to Space Unit with 1½″ USG Type G Bugle Head Screw or #10-24 machine screw.

b. adhesive attachment—Install Space Units with Durabond Space Unit Adhesive and Durabond Space Unit Tape, ¾″ wide x ⅛″ thick, applied to spacer block on Space Unit back.

3.5 light fixture protection—Install Thermafiber Light Fixture Protection, and necessary hangers and ties, in accordance with UL Design No. ( ) and ASTM C635.

3.6 air distribution

a. Attach Airson slides to the back side of all except center A-5 tile slots so that air passage through the slots can be controlled from the room side of the tile by means of a pointed instrument without removing the (tile) (panels) from the ceiling.

b. Check all drawings and job conditions and ascertain code or other requirements for covering and sealing the top and sides of the plenum space above the ceiling. Seal the plenum space tight against air leakage. Insulate all walls of the plenum space exposed to outside temperatures with insulation rated at least R-13 installed resistance.

c. Furnish zone barriers and install where shown on drawings. Turn top edge at least 2″, coat with adhesive, and permanently hold in place with sheet metal angle fastened securely. Lap all edges at least 2″ and cement together. Lap bottom edges at least 3″ on the back of the (tile) (panels) and cement directly to the (tile) (panels).

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Note: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

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UNITED STATES GYPSUM 101 South Wacker Drive, Chicago, Illinois 60606
BUILDING AMERICA

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9.1/Ce

CEILING DYNAMICS
environmental ceilings

system folder

CEILING DYNAMICS
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INTEGRATED CEILINGS
acoustical, air distribution, lighting

FEATURES OF CDI PRE-ENGINEERED, INTEGRATED ENVIRONMENTAL CEILING ASSEMBLIES

- **maximum design flexibility**
- **glare-free lighting**
- **adjustable air distribution**
- **efficient sound control**
- **low life-cycle costs**
- **economical installation**

Total concept

Environmental ceilings have received widespread acceptance because of their multi-functional performance, flexibility to meet design needs, savings in initial and operating costs. These integrated assemblies combine suspension, ceiling finish, lighting, air distribution and sound control into one subsystem. They make it easier to design, specify, coordinate, control and install interior ceiling systems.

Single responsibility

With this approach, one contractor is responsible for the final system's performance and appearance, eliminating multiple supervision common to standard ceiling construction. Because the systems are engineered at the factory, components interface properly and provide predictable results. The high cost of fabrication and installation in the field is eliminated.

Job-proven

Backed by a record of hundreds of successful jobs, Ceiling Dynamics offers architects and engineers a diverse series of systems and options to satisfy most design criteria. Suitable for all types of buildings, these assemblies are a boon to architectural creativity. Five basic systems, two of which are described here, are all integrated to provide engineered performance characteristics. The components of these ceilings can be varied or mixed to meet functional needs.

Flexible design

Architectural design is enhanced by coffered modules or flat ceilings in square, rectangular or one-way suspension systems that complement any ceiling shape. Many module sizes are available, and special modules may be engineered to mullion or column spacing. Steel or aluminum runners have low-sheen finish; exposed aluminum may be color-anodized to match other construction. Attachment and relocation of partitions are simplified; all systems are accessible and allow entrance to the plenum without damage to the components.

Lighting

Luminaires are manufactured specifically for each system with appropriate hardware and supports for easy, economical installation. Most fixtures rate exceptionally high on ESI and VCP scales and meet the scissors curve criteria without sacrificing lumen efficiency. Fixtures can be static or air-handling to control or utilize heat from lights.

Air distribution

A wide range of methods and techniques is available for air distribution including linear, perimeter and modular devices. Varying slot widths and inlet sizes permit distribution that meets most requirements. VARIAMATIC (variable volume, constant temperature) and AIRSON (pressurized plenum) Air Distribution Systems are also readily integrated into these assemblies.

Sound control

Acoustical panels for these assemblies are selected from United States Gypsum's broad variety of mineral fiber products: AURATONE Panels in five patterns with absorption up to .55-.65 NRC avg. and attenuation up to 40-44 STC; ACOUSTONE Panels in four patterns with absorption up to .70-.80 NRC avg. and attenuation up to 40-44 STC. If desired, ACOUSTONE Panels can be integrally colored to match or harmonize with surroundings.

Energy conservation

These high-performance systems require fewer light fixtures and less HVAC capacity to meet desired environmental comfort levels. Highly efficient lighting fixtures and other components reduce energy consumption, provide savings in relamp and maintenance costs for lower overall life-cycle costs.

CDI-approved contractors

To assure high-quality installation, CDI Environmental Ceiling Systems are available through dependable contractors carefully selected and licensed by Ceiling Dynamics. These recommended contractors are highly trained specialists in the design of the system and are well-equipped to survey the job, make recommendations and estimates and help architects and engineers solve functional and esthetic problems that may be encountered. Specifications, photometric and air distribution data are available from the contractor and from Ceiling Dynamics national and regional sales offices.

CDI DELTA II Environmental Ceiling in NCNB Tower, Charlotte, N.C.
Architects: ODELL ASSOCIATES, Inc.; THOMPSON, VENTULETT & STAINBACK, Inc.

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Rough-textured Glacier ACOUSTONE Panels blend with exposed DELTA Grid, above, permit special details to add distinctive ceiling appearance, below.

DELTA SERIES

ENVIRONMENTAL CEILING SYSTEMS

Functionally integrated ceilings in beautiful classic design

The DELTA Series Environmental Ceiling Systems combine esthetic simplicity with maximum functional flexibility. The narrow, 9⁄16-in. wide suspension members are concealed by the heavy, bold fissures of ACOUSTONE Glacier pattern acoustical material which is edge-cut to finish flush with the runner. Air diffusers are integrated in the luminaires, located at the perimeter or handled on a modular basis, giving a large, clear expanse of uniformly textured ceiling.

These flat ceilings require less plenum space than vaulted or coffered designs and are fully accessible for maintenance and quick rearrangement of components. The unique runner with a continuous screw slot provides rigid structural support for partitions and accessories, making possible relocation without defacing the ceiling.

The DELTA Ceiling System has achieved a 40 STC as tested by Geiger & Hamme, Inc. in accordance with AMA-1-II-1967 standards. The assembly consisted of ¾-in. Glacier Foil-Backed ACOUSTONE Panels suspended on a 24x24-in. module DELTA Grid.

Many sizes of luminaires, in plain, heat-exchange or air-handling types, each with acrylic lensing, offer maximum illumination with modular flexibility. Use of air-handling fixtures provides increased light output, reduced cooling system cost and operating savings. DELTA Series Systems offer the widest selection of options for distribution to meet virtually all design needs.

Design

Module size: 24x24-in., 30x30-in., 48x48-in., 60x60-in. sizes are standard. Other sizes up to 60x60-in. to meet planning requirements, are available on request.

Suspension system: DELTA Runners are of extruded 6063 alloy aluminum, with a continuous ¼-20 screw slot, and a heavy-textured, frost-white enamel finish. Aluminum perimeter members are flush or have ½x½-in. regress, adjustable controls and acoustical lining when used for air distribution. Perimeters are also available with solid blank-off and in a combination supply and return air member with drapery pocket.

Special colors: A series of integrally colored ACOUSTONE Acoustical Panels with matching suspension system is available.

Illumination

Luminaires for DELTA Series Ceilings are manufactured specifically for use in these systems and include all connecting hardware and supporting devices for fast installation. Fixtures have an unrestricted selection of lenses and/or diffusers and provide efficiency and illumination levels to meet most requirements. Fixture performance is tested in the integrated system; photometric data available from Ceiling Dynamics.

Fixtures, fabricated from 22-ga. steel with a bonderized white reflective finish, are suitable for use with all standard voltages and carry a UL label. Fixtures may have air supply and return slots or heat-exchange features in the frame.

Fixture size: 12x48-in., 24x24-in., 24x48-in., 30x30-in., 36x36-in. sizes are available.

Lens: Acrylic prismatic is standard; virtually all other types of lenses and diffusers are available.

Air distribution

DELTA Series systems offer an unusually wide selection of integrated options for air distribution.

Linear diffusers: suitable for perimeter and interior zone air supply. Exterior wall units may include a combination supply and return member with drapery pocket. Adjustable weirs provide six throw patterns and adjustable volume control in each slot. Units have one or two slots, slot widths and inlet sizes to meet all common capacity requirements. Acoustical lining and volume-control dampers, if required, are optional.

Perforated diffusers: available in 24x24-in. module to fit a variety of duct sizes. Provide supply air up to 900 cfm and handle return air up to 2,000 cfm at NC 35 or less, offer any combination or direction of 4-way throw. Acoustical lining and opposed-blade dampers optional.

Luxurious appearance of lounge area results from tasteful furnishings and DELTA III Environmental Ceiling with bold-patterned Glacier ACOUSTONE Panels.
FIRST FEDERAL SAVINGS & LOAN ASSOCIATION, Greenville, S.C.
Architect: FREEMAN, WELLS & MAJOR

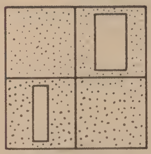
Light-troffer diffusers: all light fixtures have optional frames with air-handling slots capable of delivering up to 200 cfm at NC 35. An air pack fits over the troffer when ducted delivery or return is required.

VARIAMATIC System: used with single duct, variable volume—constant temperature distribution of conditioned air. See page 8 for details on this economical system.

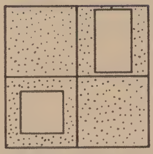
AIRSON System: conditioned air is supplied to the pressurized plenum and forced downward through specially engineered, dampened orifices in the acoustical panels. The system circumvents design and maintenance problems of ceiling diffusers and delivers draft-free air and a controllable comfort level (see page 8 for details).

Reflected ceiling views

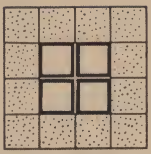
showing flat acrylic fixtures



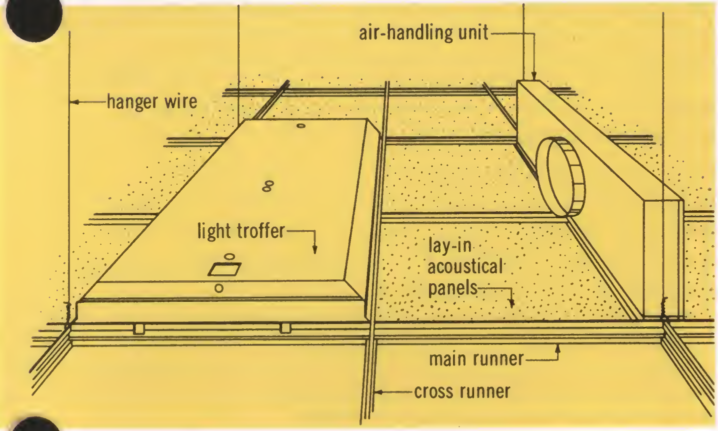
60″x60″ DELTA V

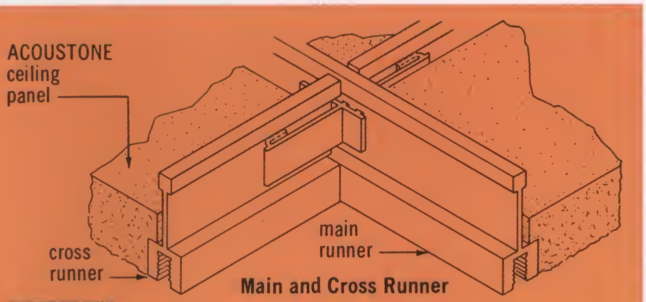


60″x60″ DELTA V

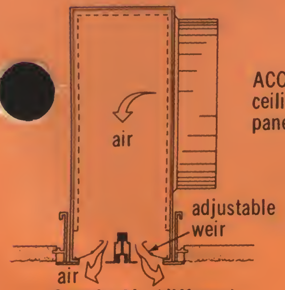


48″x48″ DELTA IV
30″x30″ DELTA 30
24″x24″ DELTA II

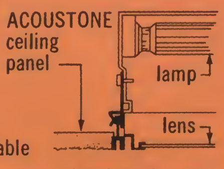




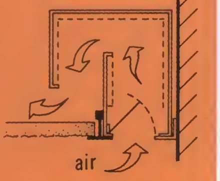
Main and Cross Runner



Supply Air (diffuser)



Lighting Fixture



Return Air (perimeter or interior)

Heat exchange data

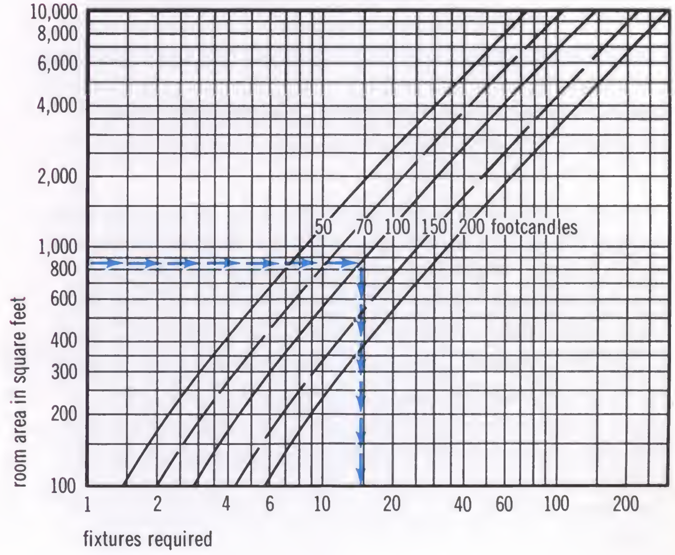
DELTA Series Air Handling Lighting Fixture:
4-lamp; 2x4-ft., acrylic prismatic lens.

cfm	heat transfer (1) —BTU/hr	return air temp. —°F	relative light output—%
10	360	108	111
20	430	95	114
30	480	90	115
40	520	87	116
50	530	85	116
60	540	83	118
70	540	82	117

(1) Based on 75°F entering air temperature.

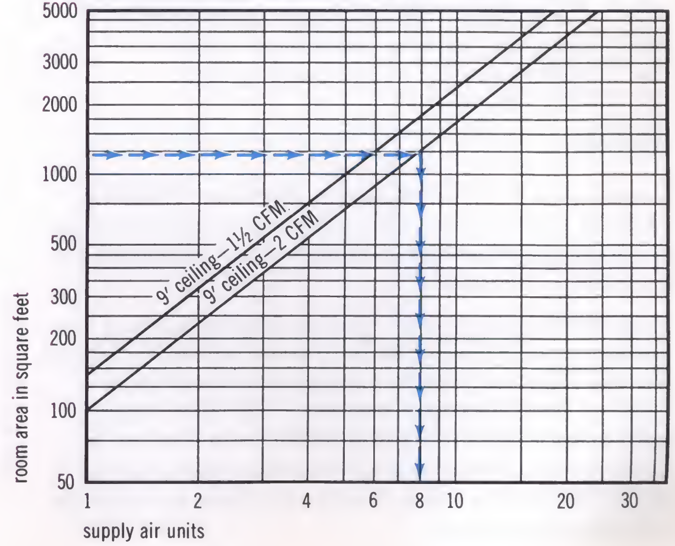
Illumination levels data

DELTA Series Lighting Fixture: 4-lamp, 2x4-ft. with two 2x2-ft. frames, acrylic prismatic lens, 75% maintenance factor.
Room reflectance: 80%/50%/30%: ceiling height: 9 to 10 ft.



Air-handling data

DELTA Series Supply Air Unit: 48-in. length, double 1″ slots.



MOD SERIES
ENVIRONMENTAL CEILING SYSTEMS

High-performance modular systems, coffered or flat in variable modules

The MOD Series Environmental Ceiling Systems provide a modular, fully accessible, coffered ceiling assembly with a great variety of options to meet esthetic and functional needs. The systems are available in standard modules as large as 6x6-ft. or in special sizes to meet spacing of other construction. Modules may be a combination of vaulted or flat panels, totally or partially illuminated.

The coffered design with luminaires at the apex provides uniform, glare-free and shadow-free lighting particularly suited to large, spacious rooms. The visual comfort probability (VCP) is higher than with the same number of fixtures in a flat ceiling.

The MOD V Ceiling System offers a 1-hr. fire rating—UL Design P222. The assembly tested consists of ⅝-in. AURATONE FIRECODE Ceiling Panels, 2x4-ft. light fixtures and linear air diffusers installed on a 60x60-in. MOD Grid System suspended from bar joists with 1½-in. steel roof deck and 1⁵⁄₁₆-in. noncombustible insulation above.

This coffered design also provides as much as 20% more area for acoustical material than with conventional flat ceilings. The MOD V Ceiling System has achieved a 43 STC as tested by Geiger & Hamme, Inc. in accordance with AMA 1-II-1967 standards. The tested assembly consisted of AURATONE Ceiling Panels, 2x4-ft. light fixtures, main and cross runners with 2-in. wide regress installed in a 60x60-in. module.

A specially designed runner, available in various regress widths, provides for quiet, high-capacity air distribution with nine adjustable throw patterns. Partitioning is readily integrated with the ceiling and can be rearranged to provide flexible space control.

Design

Module size: 30x60-in., 48x60-in., 48x48-in., 60x60-in., 72x72-in. sizes are standard. Other sizes to meet special conditions, such as window wall or column spacing, are available on request.

Suspension system: main runner, cross runner and perimeter are formed of 24-ga. galvanized steel, finished white to match acoustical panels with non-specular black horizontal regress. Available with ½-in. deep, plain or perforated regress in widths from 1 to 4 in. in ½-in. increments or in special sizes to match mullion or partition widths. Other finishes available to correlate with the interior decor.

Illumination

Luminaires for MOD Series Ceilings are manufactured to strict Ceiling Dynamics specifications for high-efficiency lighting. Fixtures have 2, 4, or 8 F40 lamps and provide illumination levels up to 150 footcandles for small rooms, over 300 footcandles for larger spaces. Each fixture is tested in its appropriate vaulted configuration; data for 24x48-in. fixture shown at right. Photometric data for other fixtures are available from Ceiling Dynamics for design purposes.

Fixtures are fabricated from 22-ga. steel, with a bonderized white, reflective finish. They are suitable for use with all standard voltages and carry a UL label. Standard lenses are acrylic prismatic type in flat or wraparound designs; virtually all other types of lenses and diffusers are available. Fixtures with heat-exchange or air-handling features are available, if desired.

Fixture size: 5x48-in., 12x48-in., 24x24-in., 24x48-in., 30x30-in., 36x36-in., 48x48-in. sizes are available.

Air distribution

These systems feature ducted air terminals above the grid regress which provide sectionalized control and allow maximum flexibility in rearranging space. Each terminal contains two weirs which offer nine optional throw patterns and provide handy fingertip adjustment from below. Depending on the regress width, these terminals have capacities up to 400 cfm at NC 35 or less.

Specific performance data are available from Ceiling Dynamics for design purposes.

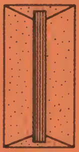
Return air is either ducted through the air terminals, returned to the plenum through the runners or perimeter which have slots or perforations in the regress, or handled through light fixtures. The light trap return, used over the runners, has an optional volume-control damper and acoustical lining for improving acoustical privacy.

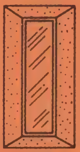
Lighting in MOD Series Systems provides a comfortable working environment with virtually no glare or shadow.

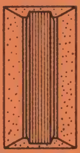
CDI environmental ceilings

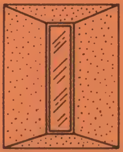
Reflected coffer views
showing flat or wrap-around acrylic lens fixtures

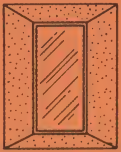
Regress Runner Series

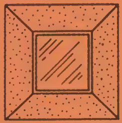

MOD 25 WA 30″x60″

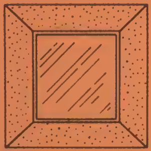

MOD 30 FA 30″x60″

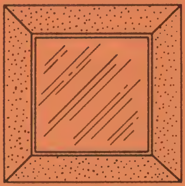

MOD 30 WA 30″x60″


MOD 45 FA 48″x60″

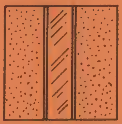

MOD 45 FA 48″x60″

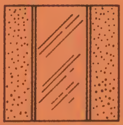

MOD IV FA 48″x48″

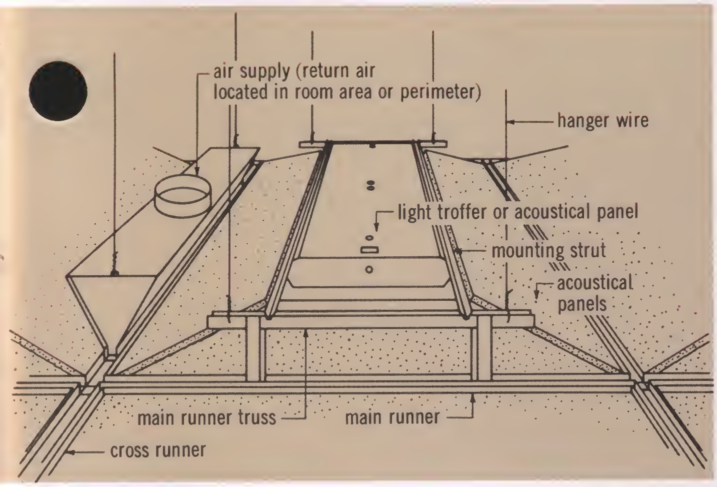

MOD V FA 60″x60″

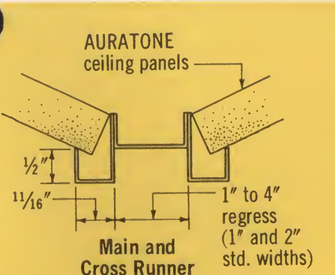

MOD VI FA 72″x72″

T-Runner Series

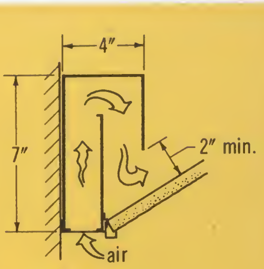

MOD IV FA 48″x48″


MOD T-48 FA 48″x48″

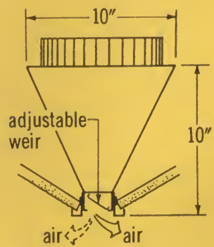

air supply (return air located in room area or perimeter)
hanger wire
light troffer or acoustical panel
mounting strut
acoustical panels
main runner truss
main runner
cross runner



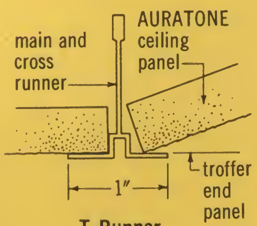
Main and Cross Runner



Return Air (perimeter or interior)

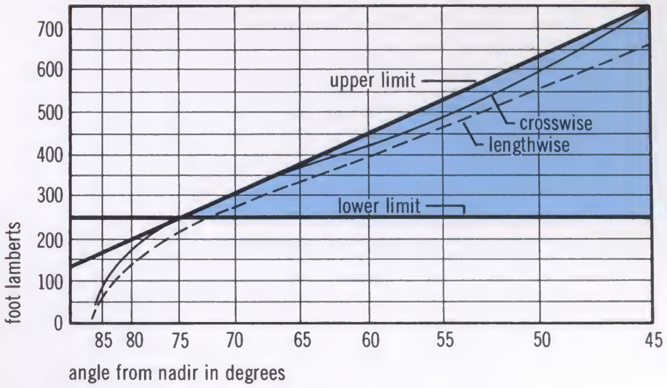


Supply Air (diffuser)

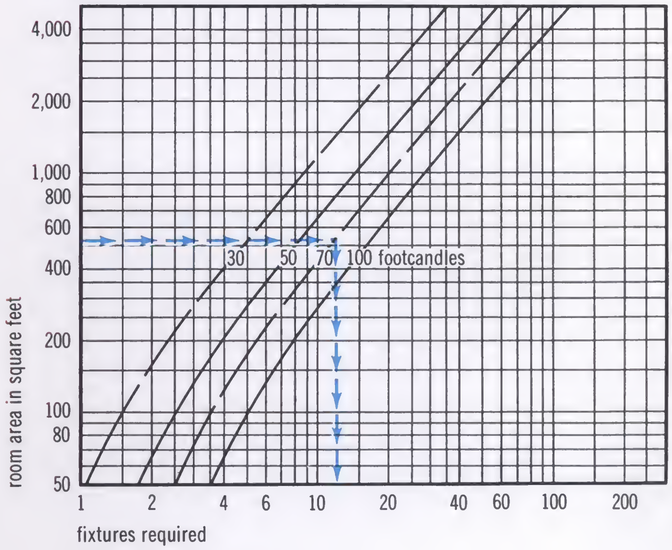


T-Runner

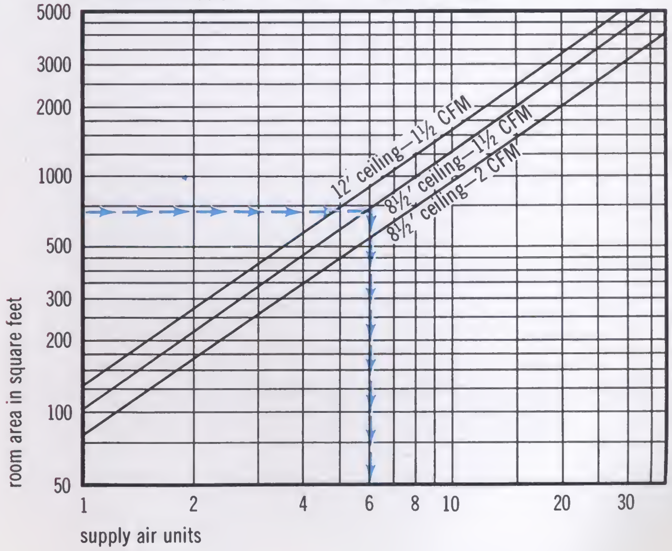
Average brightness curves
MOD-V Series Lighting Fixture: 2-lamp, 6″ coffer, 2x4 ft.



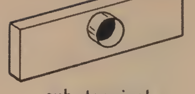
Illumination levels data
MOD Series Lighting Fixture: 2-lamp, 2x4-ft., acrylic prismatic lens, 75% maintenance factor.
Room reflectance: 80%/50%/20%; ceiling height: 9 to 10 ft.

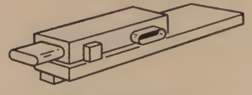


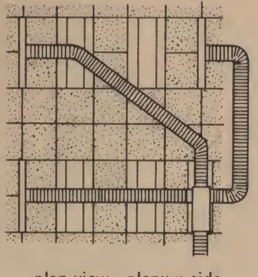
Air-handling data
MOD Series Supply Air Unit: 48-in. length, 2-in. regress.



TECHNICAL DATA
CDI
ENVIRONMENTAL CEILING SYSTEMS


sub-terminal


primary terminal


plan view—plenum side

VARIAMATIC Air Distribution Systems

In the VARIAMATIC Air Distribution Systems, a variable volume of constant-temperature air is distributed to meet changing load requirements and offset heat created by lights and people. This popular concept offers superior comfort conditioning and zone control compared to conventional systems. It also reduces initial equipment cost and provides savings in operation.

Conditioned air, ducted to terminal units, is distributed to the space through two outlet slots which esthetically blend into the grid suspension. The modular design is integrated with the DELTA Series system. Terminals are available to fit most module sizes up to 60 in. and provide up to 240 cfm per unit. They are acoustically engineered and lined with a non-eroding, sound-absorbing material to assure low NC levels.

Sound absorption values

product	thick-ness	mount-ing	sound absorption coefficients						NRC range
			band center frequency—Hz						
			125	250	500	1000	2000	4000	
AGOUSTONE Tile									
Seacrest	¾″	7	.34	.34	.69	.93	.98	.99	.70-.80
Glacier	¾″	7	.28	.25	.53	.93	.97	.93	.60-.70
AURATONE Panels Pin-Perforated	⅝″	7	.27	.31	.54	.65	.51	.40	.45-.55

Primary terminals receive ducted air for distribution and govern up to three additional sub-terminal units. Volume control dampers in the primary unit, actuated by a wall-mounted or built-in thermostat, admit the exact quantity of cool air needed. Another built-in control prevents excessive flow caused by duct-pressure fluctuations. Field-adjustable dampers control the flow to the sub-terminals. Both primary and sub-terminals have rotating weirs which provide 1-way, 2-way and vertical throw patterns and have fingertip adjustment from below. The diffusers provide reasonably constant air motion for minimal and maximum flow without dumping. Specific air distribution data for design purposes are available from Ceiling Dynamics.

AIRSON Air Distribution Systems

In the AIRSON Air Distribution Systems, primary equipment supplies properly conditioned air to the plenum chamber above the acoustical ceiling. The air is forced through controlled jets in the ceiling to provide draft-free distribution and a controllable comfort level throughout the space. Suitable for both heating and cooling, the AIRSON Systems may be zoned to account for varying design requirements within the occupied space. Specific air distribution data for design purposes are available from Ceiling Dynamics.

Sound attenuation properties

product	thick-ness	mounting	sound attenuation factors—db																STC range
			band center freuency—Hz																
			125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
ACOUSTONE Tile																			
Seacrest	¾″	CE	28	34	35	29	29	32	33	37	39	40	40	44	45	45	46	47	35-39
Glacier	¾″	DELTA II (1)	30	36	38	31	31	33	36	38	39	41	42	45	47	48	49	50	40-44
AURATONE Panels Pin-Perforated	⅝″	CE	32	35	35	28	30	32	33	37	40	43	47	51	53	54	54	55	40-44
	⅝″	MOD V	26	34	36	34	34	36	39	42	43	43	44	48	49	49	49	50	40-44

Footnotes—Sound Characteristics Tables. All test results shown are from independent recognized laboratories. (1) Suspended on exposed Delta grid. Tile is face-rabbeted on four edges. All surfaces tested were painted.

Abbreviations, mountings: No. 7—metal suspension system; CE—exposed suspension system, continuous at partitions; MOD V—MOD V Series Integrated ceiling system.

CEILING DYNAMICS
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So. El Monte, Calif. 91733 (213) 579-2652

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Note: All products described here may not be available in all geographic markets. Consult nearest CDI sales office or representative for information.

SA-907/USG/1-77 Printed in U.S.A.

IMPERIAL Plaster Systems

HIGH-STRENGTH VENEER

system folder

partition applications

fire rating	description	test no.	stc rating 11-f	stc rating 16-f	comments
1 hr.	Stl Stud—1 layer ½″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster—3⅝″ USG studs—base screw att—1½″ THERMAFIBER sound atten blkts stapled one side—joints stag & taped—1/16″ IMPERIAL plaster—perimeter caulked wt 8 width 4¾″	T-3124-OSU (f) CK-664-1 (s)		45	Fire test based on assembly with 2½″ studs, without blankets Stud spacing at 16″ o.c. recommended
2 hrs.	Stl Stud—2 layers ⅝″ IMPERIAL FIRECODE gypsum base & veneer plaster—2½″ or 3⅝″ USG studs 24″ o.c.—base layer screw att—face layer lamin or screw att—joints taped—1/16″ IMPERIAL plaster wt 12 width 6⅜″	UL Des U411 (f) (was 11-2 hr) TL-75-70 (s) TL-75-73 (s)		51 47	Sound tests based on 2½″ studs. TL-75-70 based on same constr. with 1½″ THERMAFIBER blankets
2 hrs.	Stl Stud—2 layers ½″ IMPERIAL FIRECODE gypsum base & veneer plaster—2½″ USG studs 24″ o.c.—both layers appl vert, joints stag & screw att—1/16″ IMPERIAL plaster—perim caulked wt 10 width 4¾″	UL Des U303 (f) (was 27-2 hr) CK 654-66 (s)		53	CK 654-66 based on assembly with 1″ THERMAFIBER blankets
2 hrs.	Stl Stud—2 layers ½″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster—2½″ or 3⅝″ USG studs 24″ o.c. —2″ THERMAFIBER sound atten blkts stapled one side—base appl vert & joint stag—base layer screw att—face layer strip lamin or screw att—joints taped—1/16″ IMPERIAL plaster—perimeter caulked wt 10 width 4¾″	UL Des U412 (f) (was 28-2 hr) Field Test KSO-1090072-a (s)	48	49	Fire rating based on assembly with or without sound blankets Field test includes 2 caulked outlets each side

ceiling applications

fire rating	description	test no.	sound rating STC	sound rating IIC	comments
2 hrs. (beam 2 hrs.)	½″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling furred or susp—USG met fur chan—base att with screws 12″ o.c.—joints taped—1/16″ IMPERIAL plaster—2½″ conc on riblath or corrug stl deck over bar joist clg wt 4	UL Des G515 (f) (was 221-2 hr)	N/A		Spacing of furring channel at 16″ o.c. recommended
3 hrs. (beam 3 hrs.)	⅝″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—USG met fur chan—base att with 1″ Type S screws 12″ o.c.—joints exp or taped—1/16″ IMPERIAL plaster—3″ conc on riblath over bar joist clg wt 4	UL Des G512 (f) (was 82-3 hr)	N/A		Spacing of furring channel at 16″ o.c. recommended

beam application

fire rating	description	test no.	STC	IIC	comments
3 hrs. (beam only)	Gypsum Lath and Veneer Plaster Caged Beam Fireprfg—1⅝″ USG stl run chan brackets 24″ o.c.—⅞″ x 1⅜″ corner angles att to chan brackets—3 layers ⅝″ IMPERIAL FIRECODE base att with Type S screws—1″ 20-ga. hex mesh on bottom over middle layer—met beads on corners—joints taped—1/16″ IMPERIAL plaster—2½″ conc deck on fluted stl flr	UL Des N505 (f) (was 214-3 hr)	N/A		Fire rating for restrained assembly; 2-hr. rating for unrestrained assembly Extends veneer plaster use to beam protection

For wall furring applications, see page 8.

description

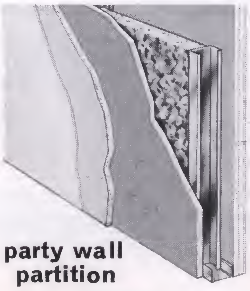
In the Imperial Plaster Systems a thin veneer (1/16″ to 3/32″ thick) of specially formulated, high-strength gypsum plaster is applied over Imperial Gypsum Base. Either Imperial Finish Plaster is applied in a single-coat system, or Imperial Basecoat Plaster is used in a two-coat application as a superior base for Imperial Finish Plaster, Diamond Interior Finish, Structo-Gauge Gauging Plaster and lime, or Keene's-lime-sand-float finish.

Imperial Gypsum Base, 4 ft. wide, has a high-strength, high-density core, either regular, Firecode or Firecode "C" type, covered with special absorption face paper designed for veneer plastering. Versatile Imperial Base, as outlined below, is used with steel or wood studs or metal furring channels to meet design requirements for interior partitions and ceilings; party, chase and shaft walls; furring and column fireproofing.

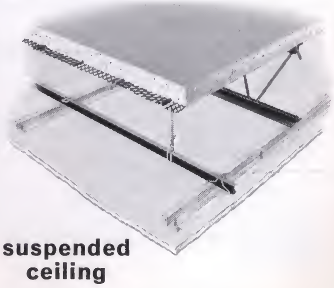
1. USG Steel Studs, available in 8 widths (see Specifications, page 10), set in steel runners, with 1-layer, ½″ thick Imperial Firecode "C" Base, screw-attached to 2½″ studs 16″ o.c. This assembly has a 1-hour fire rating, is suited for interior partitions and corridor walls. With double-layer ½″ Imperial Firecode "C" Base, attached by means of Type S Screws to 2½″ or 3⅝″ studs spaced 24″ o.c., a 2-hour fire rating plus sound control suitable for party walls is available. Where added partition width is required, double rows of USG Steel Studs are erected to provide chase walls with up to 20¾″ net pipe chase width (see page 6). Up to 4-hour column fire protection is also available (see separate System Folder SA-923).

2. Metal Furring Channel—With Foil-Back Imperial Gypsum Base screwed to USG Metal Furring Channels erected 16″ o.c. direct to masonry or furred with brackets and ¾″ channels, this construction provides an excellent vapor barrier and offers

(continued on page 2)



party wall partition



suspended ceiling

description *(continued from page 1)*

significant insulating value as exterior wall furring (see page 8). A 3-hour fire-rated ceiling construction including beam protection is available with ⅝″ IMPERIAL FIRECODE "C" Base screw-attached to furred or suspended USG Metal Furring Channels (see page 8). Z-Furring Channels are also used to mechanically attach THERMAFIBER Z-Furring Insulating Blankets to exterior walls. With ½″ or ⅝″ IMPERIAL Gypsum Base screw-attached to these channels, the assembly provides a fully insulated wall at a cost competitive with many non-insulated furred walls.

3. USG Steel C-H Studs—IMPERIAL Gypsum Base applied in one or two layers with gypsum coreboard and Steel C-H Studs provides systems with up to 3-hour fire ratings. These are ideally suited for enclosing elevator shafts, stairwells and other vertical shafts in core areas of multi-story buildings (see System Folder SA-922 for Shaft Wall applications.)

4. Wood Framing—IMPERIAL Base may be nail or screw-attached to wood framing where 1 or 2-hour fire protection is needed. With base screw-attached to resilient channels, sound ratings up to 53 STC are obtained. For details refer to U.S.G. System Folder SA-913, Veneer Plaster and Wood Framing.

function and utility

IMPERIAL Plaster Systems are designed for interior partitions and ceilings, exterior wall furring or wherever conventional plaster or drywall systems are used. The integrated components offer beautiful, hard surfaces ready for next-day decoration. IMPERIAL Plaster provides 3,000 psi compressive strength.

Durability—The high-strength, abrasion- and crack-resistant features of IMPERIAL Plaster offer the durability needed in high-traffic areas, and obtainable with few other materials.

Fire Resistance—Noncombustible components provide systems with fire-resistance ratings up to 3 hours (see table, page 1).

Sound Control—The systems offer sound isolation up to 53 STC; ideal for party walls.

Versatility—Adaptable to most dimensions or modules in virtually all types of buildings, these systems meet all normal design and job conditions.

Light Weight—The completed partition systems weigh appreciably less than masonry assemblies of the same thickness.

Economy—Simple, inexpensive components erect quickly at a lower cost than conventional plaster systems. Finish is rapidly applied by machine or hand application.

limitations

1. Non-load bearing.
2. These assemblies should not be used where exposed to abnormal moisture or excessive humidity or temperature.
3. Maximum frame spacing and limiting heights should not be exceeded (see tables below).

maximum frame spacing

lath and plaster assembly	steel studs or furring channels
½″ IMPERIAL Gypsum Base	
one layer, 1-coat plaster	16″
one layer, 2-coat plaster	16″ or 24″ (1)
two layer, 1 & 2-coat plaster	24″
⅝″ IMPERIAL Gypsum Base	
one layer, 1-coat plaster	16″ or 24″ (1)
one layer, 2-coat plaster	24″
two layer, 1 & 2-coat plaster	24″

(1) 24″ spacing requires joint treatment with DURABOND Compound and PERF-A-TAPE Reinforcing.

limiting height—steel stud assemblies(1)

stud style	stud width	stud spacing	allow. defl.	partition, one layer	partition, two layers	furring, one layer
USG Steel Studs (ST5)						
158ST5	1⅝″	16″	1/240 1/360	10′0″d 8′9″d	11′3″f 9′9″d	8′6″d 7′6″d
		24″	1/240 1/360	8′9″d 7′6″d	9′3″f 8′6″d	7′6″d —
20ST5	2″	16″	1/240 1/360	11′3″d 10′0″d	12′6″d 11′0″d	10′0″d 8′9″d
		24″	1/240 1/360	10′0″d 7′6″f	10′6″f 9′6″d	8′9″d 7′6″d
212ST5	2½″	16″	1/240 1/360	13′0″d 11′6″d	14′3″d 12′6″d	11′6″d 10′0″d
		24″	1/240 1/360	11′6″d 10′0″d	12′0″f 11′0″d	10′0″d —
30ST5	3″	16″	1/240 1/360	14′9″d 13′0″d	16′0″d 14′0″d	13′3″d 11′6″d
		24″	1/240 1/360	13′0″d 11′3″d	13′9″f 12′3″d	11′3″f 10′0″d
358ST5	3⅝″	16″	1/240 1/360	16′9″d 14′9″d	18′0″d 15′9″d	15′3″d 13′3″d
		24″	1/240 1/360	14′9″d 12′9″d	15′6″f 13′9″d	12′6″f 11′6″f
40ST5	4″	16″	1/240 1/360	18′0″d 15′9″d	19′3″d 16′9″d	16′3″f 14′3″d
		24″	1/240 1/360	15′9″d 13′9″d	16′6″f 14′9″d	13′3″f 12′6″d
60ST5	6″	16″	1/240 1/360	19′9″f 17′9″d	19′9″f 19′6″d	15′0″f 14′6″d
		24″	1/240 1/360	16′0″f 15′0″d	16′0″f 16′0″f	12′3″f 12′3″f
USG Steel Studs (ST10)						
20ST10	2″	16″	1/240 1/360	12′9″d 11′0″d	13′9″d 12′0″d	11′9″d 10′3″d
		24″	1/240 1/360	11′0″d 9′9″d	12′0″d 10′6″d	10′3″d 9′0″d
212ST10	2½″	16″	1/240 1/360	13′9″d 12′0″d	15′9″d 13′9″d	13′9″d 12′0″d
		24″	1/240 1/360	12′0″d 10′6″d	13′9″d 12′0″d	12′0″d 10′6″d
30ST10	3″	16″	1/240 1/360	16′9″d 11′6″d	17′9″d 15′6″d	15′9″d 13′9″d
		24″	1/240 1/360	14′6″d 10′0″d	15′6″d 13′6″d	13′9″d 12′0″d
358ST10	3⅝″	16″	1/240 1/360	18′3″d 16′0″d	20′0″d 17′6″d	18′0″d 15′9″d
		24″	1/240 1/360	16′0″d 14′0″d	17′6″d 15′3″d	15′9″d 13′9″d
40ST10	4″	16″	1/240 1/360	19′6″d 17′0″d	21′6″d 18′9″d	21′6″d 18′9″d
		24″	1/240 1/360	17′0″d 15′0″d	18′9″d 16′6″d	18′9″d 16′6″d
60ST10	6″	16″	1/240 1/360	21′9″d 19′0″d	25′6″d 22′3″d	21′6″d 18′9″d
		24″	1/240 1/360	19′0″d 16′9″d	22′3″d 19′6″d	18′9″d 16′6″d
USG Light Steel Studs						
35ST8	3½″	16″	1/240 1/360	18′3″d 16′0″d	18′9″d 16′6″d	17′3″d 15′0″d
		24″	1/240 1/360	16′0″d 14′0″d	16′6″d 14′6″d	15′0″d 13′3″d
35ST10	3½″	16″	1/240 1/360	19′0″d 16′9″d	19′9″d 17′3″d	18′0″d 15′9″d
		24″	1/240 1/360	16′9″d 14′6″d	17′3″d 15′0″d	15′9″d 13′9″d

(1) Limiting height for ½″ or ⅝″ thick base and 5 psf uniform load perpendicular to partition or furring. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

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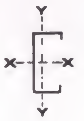
technical data/components/details

sound transmission loss—db

test no.	method	band center frequency—Hz																STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
TL-75-70	Lab	31	39	42	45	49	51	53	53	54	55	55	52	47	48	51	54	51
CK-654-66	Lab	31	40	44	46	48	52	52	53	53	54	53	53	54	55	57	59	53
KSO-1090072-a	Field	26	29	37	39	45	48	48	49	52	54	55	52	52	53	55	56	49
TL-75-73	Lab	27	31	34	39	41	44	47	49	52	54	54	49	44	47	51	54	47
CK-664-1	Lab	27	32	39	40	42	44	44	46	47	45	45	46	44	44	46	49	45

structural properties



stud style	I in.^{4}x-x	S in.^{3}x-x	R in.x-x
158ST5	0.043	0.047	0.689
20ST5	0.069	0.062	0.837
212ST5	0.115	0.082	1.028
30ST5	0.174	0.105	1.213
358ST5	0.269	0.135	1.588
40ST5	0.338	0.154	1.583
60ST5	0.324	0.146	1.648
20ST10	0.126	0.123	0.820
212ST10	0.210	0.164	1.012
30ST10	0.320	0.209	1.197
358ST10	0.497	0.269	1.422
40ST10	0.626	0.307	1.553
60ST10	0.864	0.396	2.076
35ST8	0.422	0.242	1.395
35ST10	0.506	0.291	1.391

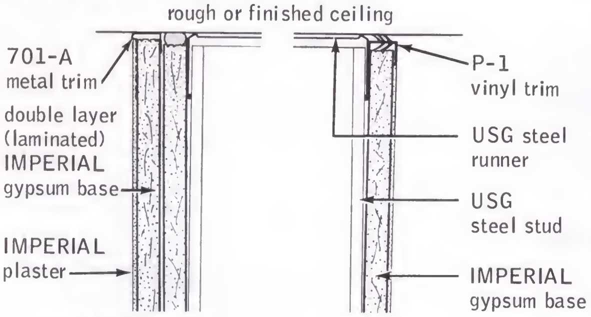
limiting height—chase wall partitions(1)

stud style	stud width	stud spacing	allow. defl.	one layer	two layers
158ST5	1⅝″	16″	1/240	13′3″d	14′0″d
			1/360	11′6″d	12′3″d
		24″	1/240	11′6″d	12′3″d
			1/360	10′3″d	13′0″f
212ST10	2½″	16″	1/240	19′6″d	25′0″d
			1/360	17′0″d	21′9″d
		24″	1/240	17′0″d	21′9″d
			1/360	14′9″d	19′0″d

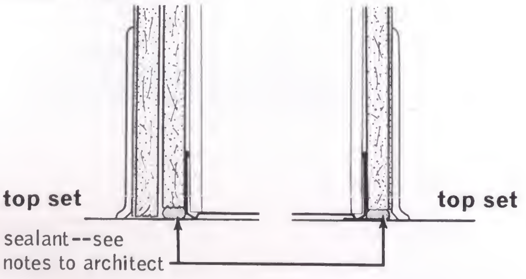
(1) Limiting height for ½″ or ⅝″ thick base and 5 psf uniform load perpendicular to partition. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

steel stud partitions

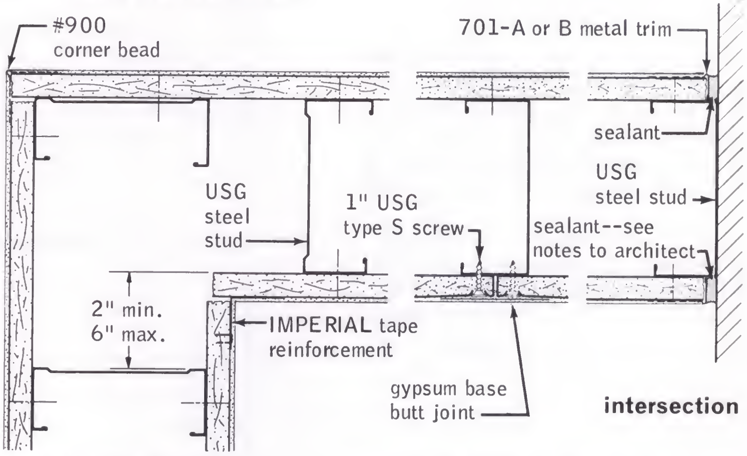
ceiling attachment



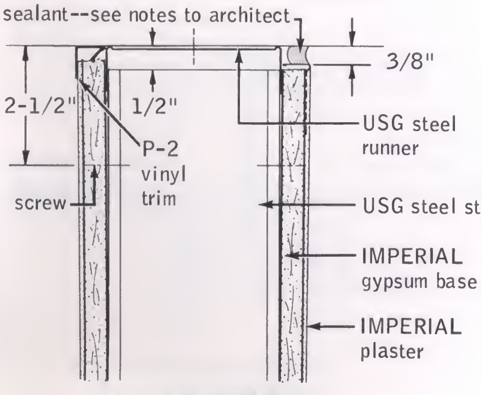
floor attachment



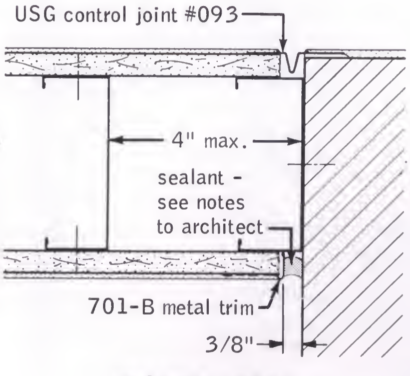
wall plan sections



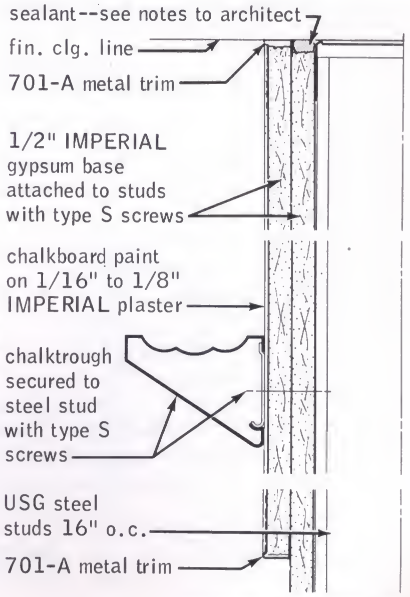
partition corner



perimeter relief
ceiling intersection



perimeter relief and control joint
wall or column intersection

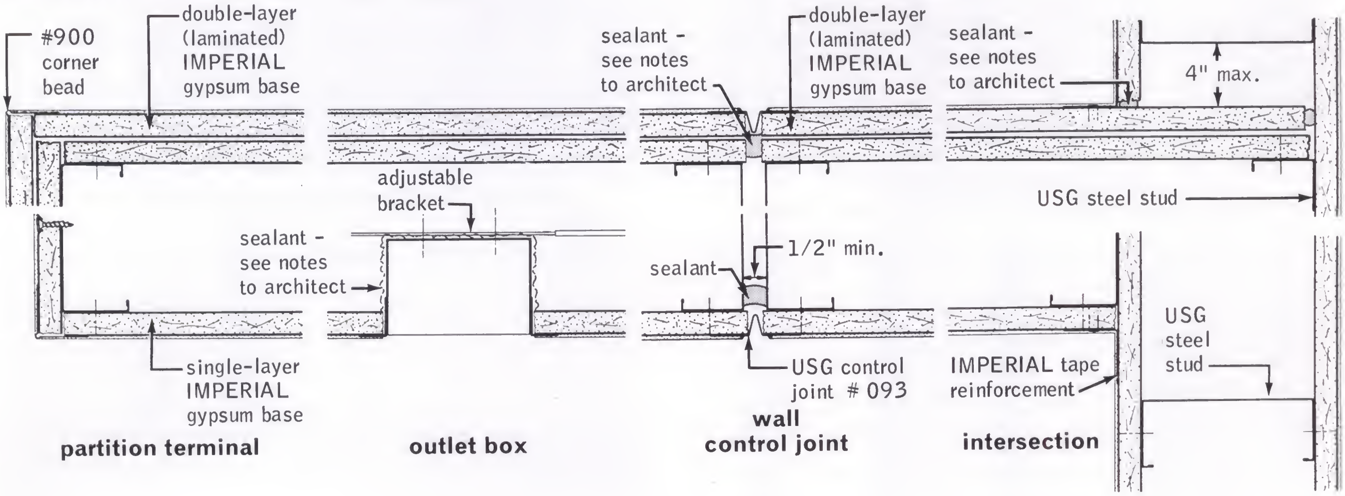

sealant--see notes to architect
fin. clg. line
701-A metal trim
1/2" IMPERIAL gypsum base attached to studs with type S screws
chalkboard paint on 1/16" to 1/8" IMPERIAL plaster
chalktrough secured to steel stud with type S screws
USG steel studs 16" o.c.
701-A metal trim

plaster chalkboard

details/steel stud assembly

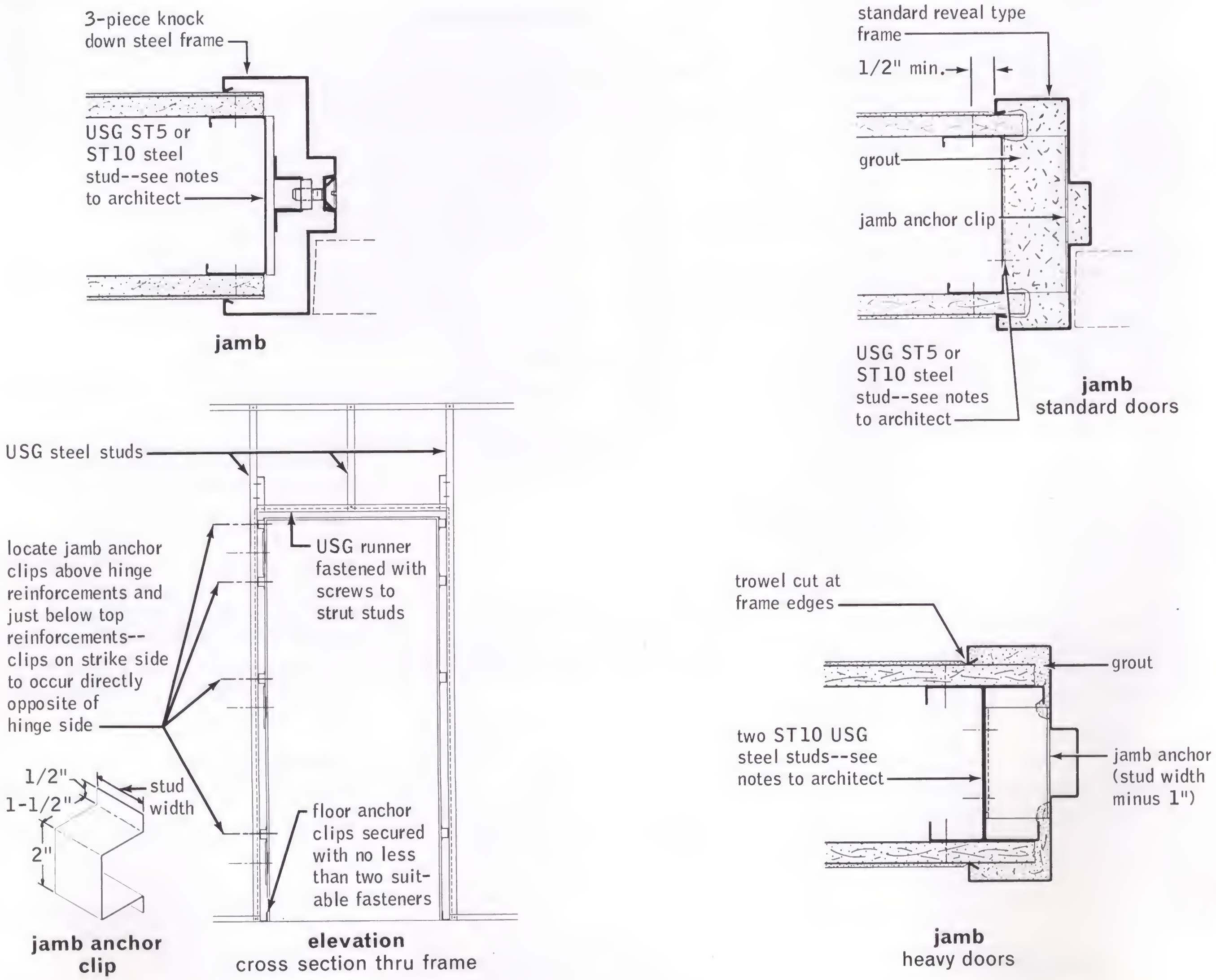
scale: 3″ = 1′-0″

wall plan sections


#900 corner bead
double-layer (laminated) IMPERIAL gypsum base
single-layer IMPERIAL gypsum base
adjustable bracket
sealant - see notes to architect
sealant - see notes to architect
double-layer (laminated) IMPERIAL gypsum base
sealant
1/2" min.
USG control joint # 093
sealant - see notes to architect
4" max.
USG steel stud
IMPERIAL tape reinforcement
USG steel stud

partition terminal **outlet box** **wall control joint** **intersection**

door frames


3-piece knock down steel frame
USG ST5 or ST10 steel stud--see notes to architect
standard reveal type frame
1/2" min.
grout
jamb anchor clip
USG ST5 or ST10 steel stud--see notes to architect
USG steel studs
locate jamb anchor clips above hinge reinforcements and just below top reinforcements--clips on strike side to occur directly opposite of hinge side
USG runner fastened with screws to strut studs
floor anchor clips secured with no less than two suitable fasteners
1/2"
1-1/2"
stud width
2"
trowel cut at frame edges
grout
two ST10 USG steel studs--see notes to architect
jamb anchor (stud width minus 1")

jamb

jamb
standard doors

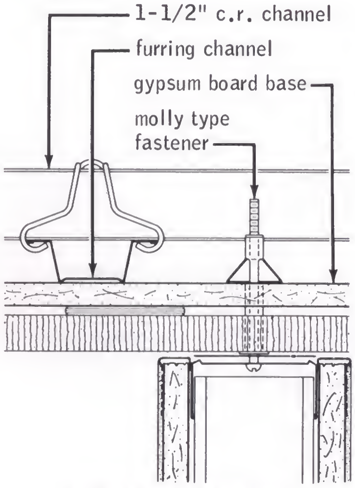
jamb anchor clip

elevation
cross section thru frame

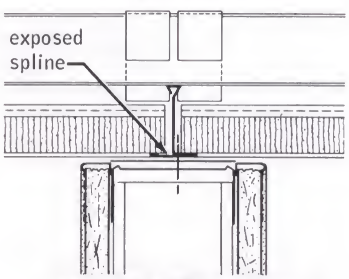
jamb
heavy doors

details/steel stud assembly

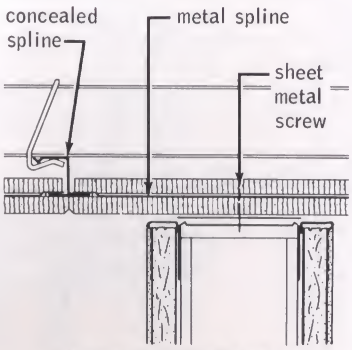
attachment of partition to ceiling



adhesively applied acoustical tile



exposed grid system for acoustical tile & board

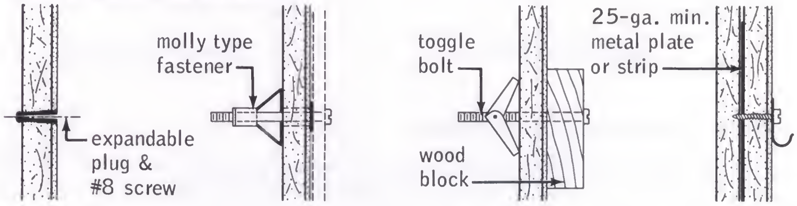


concealed grid system for acoustical tile

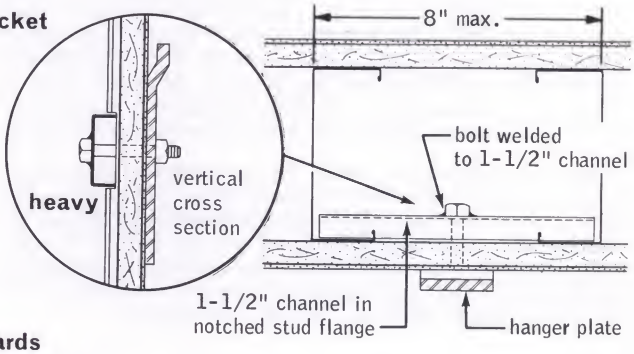
fixture attachment load table

type fastener or attachment		allowable withdrawal resistance—lb.	allowable shear resistance—lb.
fiber or plastic plug	#6 screw	10	40
	#8 screw	15	40
	#10 screw	20	50
	#12 screw	30	60
	#14 screw	30	75
toggle or molly	⅛" bolt	20	40
	$\frac{3}{16}$" bolt	30	50
	¼" bolt	40	60
no. 8 sheet metal screw into 25-ga. metal sheet		50	100
¼" molly or toggle bolt into ST5 steel stud		155	175
type fastener or attachment		**allowable static load—lb.**	**allowable impact load—lb.**
plumbers bracket attached with $\frac{5}{16}$" bolts and 1½" channels		350	75
type fastener or attachment		**uniform load—lb. per bracket**	**uniform load—lb. per lin. ft.**
angle brackets (24" o.c.)		100	50
slotted standards (24" o.c.)			
light (.063" thick)		40	20
medium (.082" thick)		100	50
heavy (.094" thick)		150	75

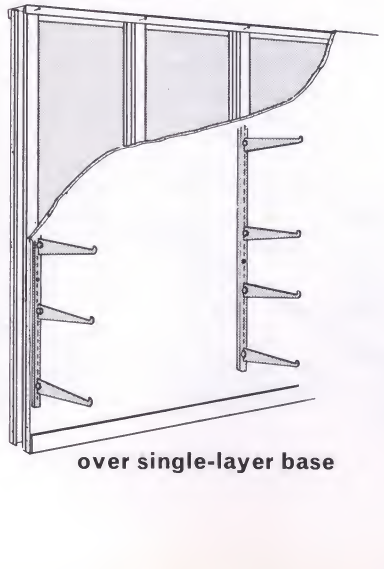
fixture attachments—light



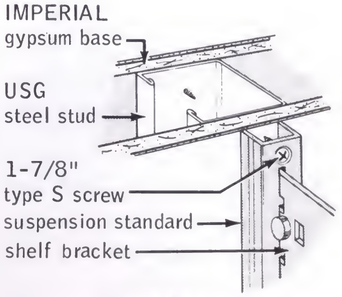
plumbers bracket


heavy
vertical cross section
8" max.
bolt welded to 1-1/2" channel
1-1/2" channel in notched stud flange
hanger plate

slotted standards



over single-layer base



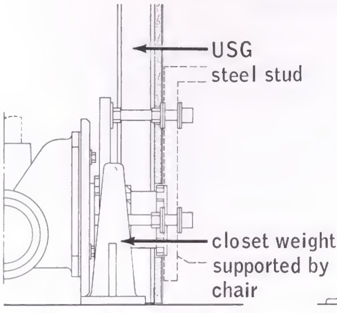
cross-section

details

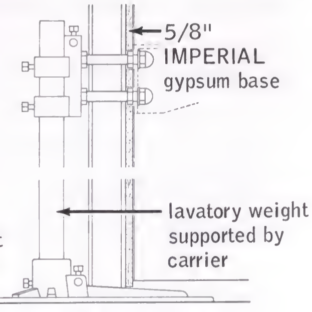
chase walls

Chase walls, as vertical shafts encasing the usual plumbing supply and wastelines, vent ducts and electrical conduits, require more free space than can be provided within the usual partition assembly.

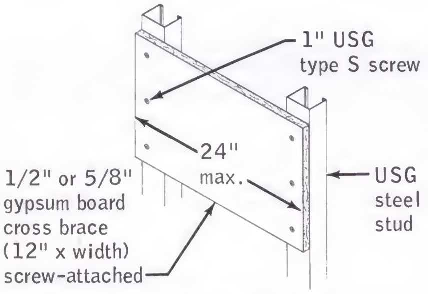
The steel stud chase wall may be formed of two USG Steel Studs bracketed together with 12″ x chase width braces of ½″ or ⅝″ IMPERIAL Gypsum Base. As an alternate, 2½″ steel stud cross braces screw-attached to chase wall studs may be used. When chase wall studs are not directly opposite, steel stud cross braces 24″ o.c. are securely anchored to a continuous horizontal 2½″ runner screw-attached to chase wall studs within the cavity. Limiting height for this chase wall is shown on page 2; vertical brace spacing 48″ o.c. max.



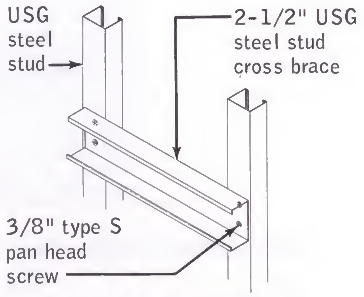
closet carrier



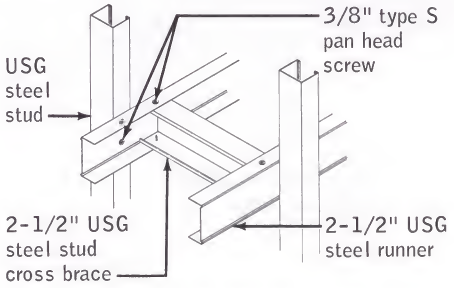
lavatory carrier



gypsum brace



steel stud brace



steel stud & runner brace

furred or suspended ceilings

IMPERIAL Plaster Ceiling Systems consist of IMPERIAL Gypsum Base, FIRECODE "C" or regular, screw-attached to USG Metal Furring Channels. These channels are firmly clipped or wire-tied to suspended main runner channels or wire-tied to main support members. USG Brand Type S Screws are used to attach the base to the furring channels. For long span requirements resulting from the location of large ducts or pipes in the ceiling space, the USG Steel Stud may be used as a ceiling furring member in this construction (see table at right).

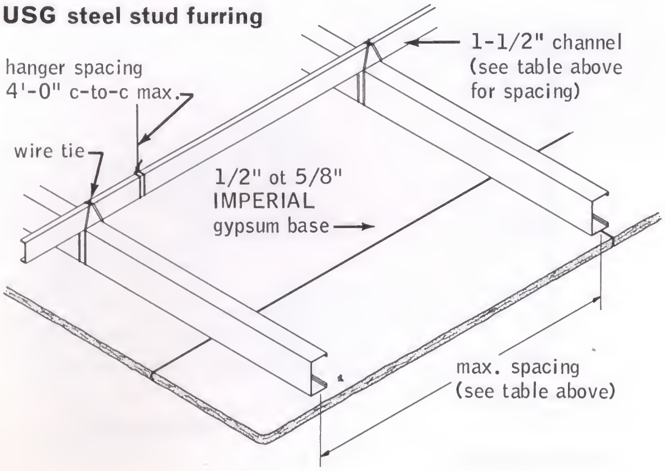
These noncombustible assemblies are designed for interior furred or suspended ceilings or caged beam fireproofing. They serve to conceal and protect structural and mechanical elements with a lightweight fire-resistant ceiling that is highly light reflective when unfinished or is easily decorated and maintained. Perfectly integrated components provide beautiful, hard surfaces ready for next-day decoration.

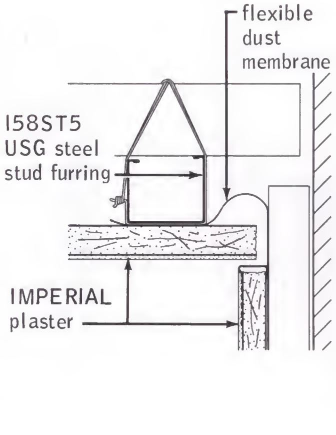
component spacing

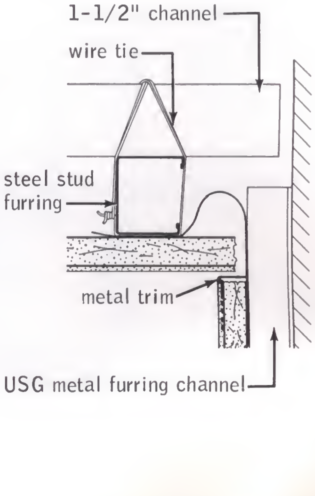
type furring member		ceiling systems—component spacing				
		furring member c. to c. spacing		main support member c. to c. spacing		hangers c. to c.
		for plaster base thickness of:				
		½″	⅝″	½″	⅝″	
USG Metal Furring Channel		16″	16″†	4′-0″	4′-0″	4′-0″
USG Steel Stud	1⅝″ erected with both flanges up and against main support member	16″	16″†	5′-0″	5′-0″	4′-0″
	2½″	16″	16″†	10′-3″	10′-3″	
	3⅝″	16″	16″†	13′-6″	13′-6″	

†24″ spacing may be used with 2-coat plastering.

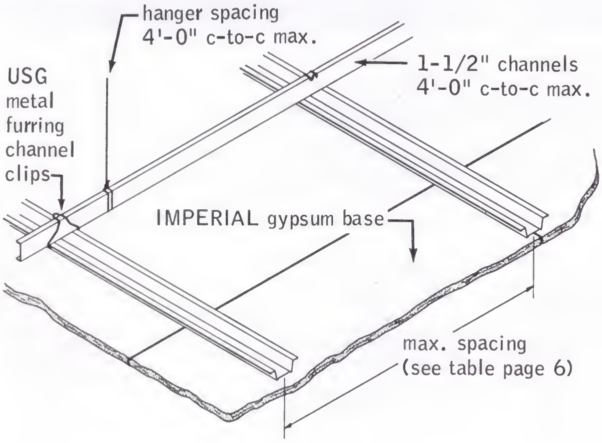
USG steel stud furring

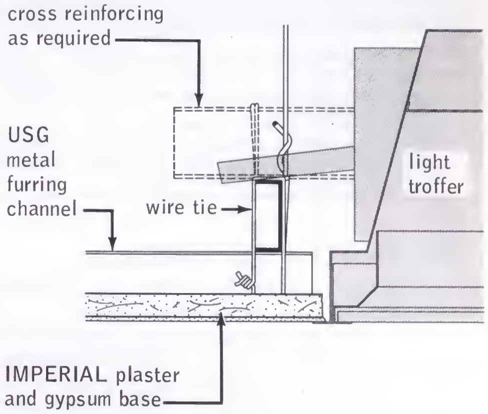


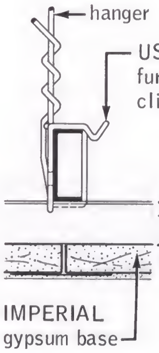


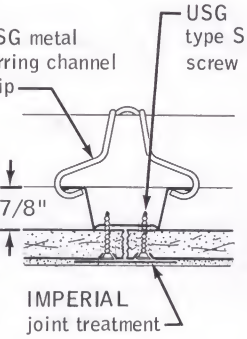


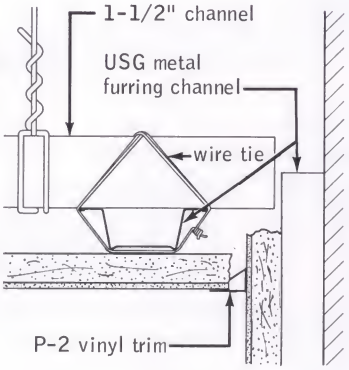
USG metal furring channel

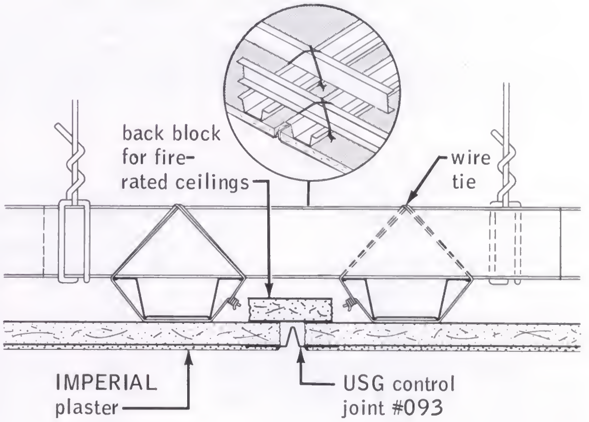

hanger spacing 4'-0" c-to-c max.
USG metal furring channel clips
1-1/2" channels 4'-0" c-to-c max.
IMPERIAL gypsum base
max. spacing (see table page 6)


cross reinforcing as required
USG metal furring channel
wire tie
light troffer
IMPERIAL plaster and gypsum base

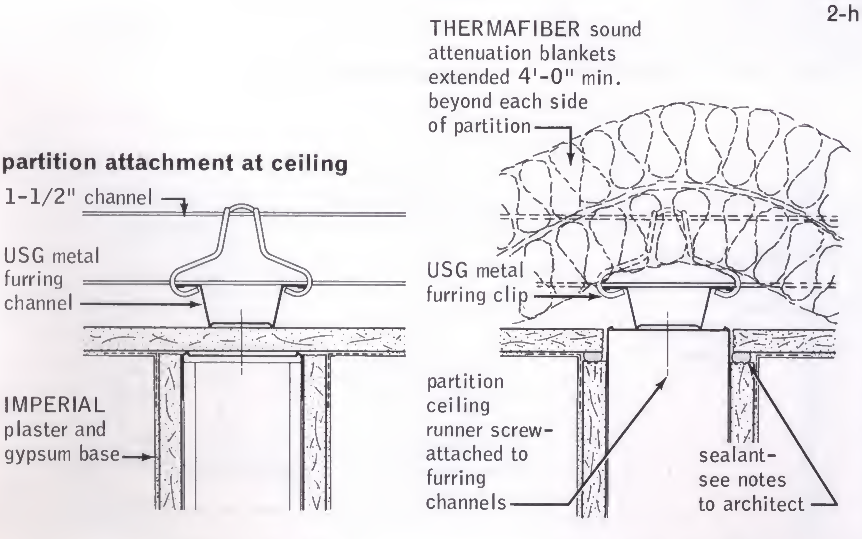








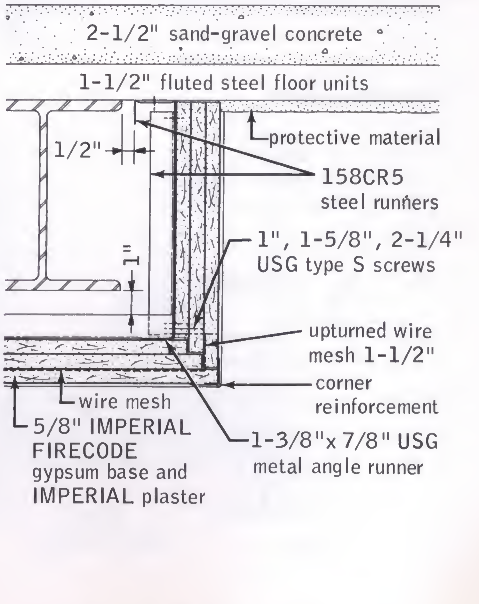
partition attachment at ceiling


1-1/2" channel
USG metal furring channel
IMPERIAL plaster and gypsum base
THERMAFIBER sound attenuation blankets extended 4'-0" min. beyond each side of partition
USG metal furring clip
partition ceiling runner screw-attached to furring channels
sealant-see notes to architect

continuous ceiling

interrupted ceiling

beam protection (beam only)
3-hr. UL design no. N505 (restrained assembly)
2-hr. UL design no. N505 (unrestrained assembly)


2-1/2" sand-gravel concrete
1-1/2" fluted steel floor units
1/2"
protective material
158CR5 steel runners
1"
1", 1-5/8", 2-1/4" USG type S screws
upturned wire mesh 1-1/2"
corner reinforcement
wire mesh
5/8" IMPERIAL FIRECODE gypsum base and IMPERIAL plaster
1-3/8"x 7/8" USG metal angle runner

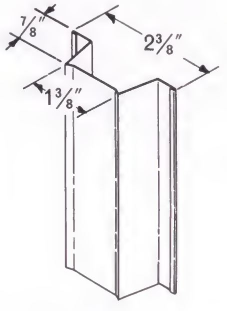
exterior wall furring/metal channels

description	comments
1″ THERMAFIBER Z-Furring Blankets—USG Z-Furring Channels appl vert 24″ o.c.—½″ IMPERIAL gypsum base screw-attached to channels, 1/16″ IMPERIAL veneer plaster finish	Surface membrane isolated from masonry
USG Metal Furring Channels 16″ o.c., ½″ Foil-Back IMPERIAL gypsum base screw-attached to channels, 1/16″ IMPERIAL veneer plaster finish	May be attached direct or additionally furred out on ¾″ horizontal cold-rolled channels; good vapor barrier

USG Metal Furring Channels

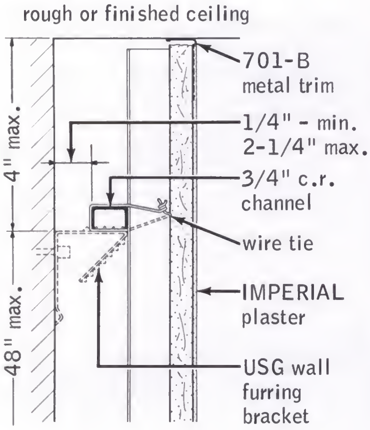
Exterior walls are readily furred using Imperial Gypsum Base screw-attached to USG Metal Furring Channels erected vertically 16″ o.c. Channels are either fastened directly to masonry or furred using USG Adjustable Wall Furring Brackets and ¾″ channels to provide additional space for pipes, conduits or ducts. With the Adjustable Wall Furring Bracket, the limiting height is 12 ft.

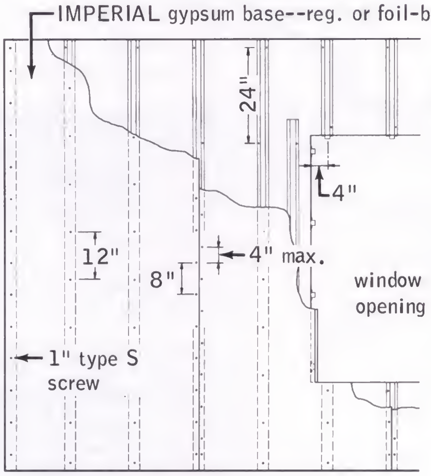
In this assembly, Foil-Back Imperial Gypsum Base has thermal resistance (R) values of 3.93 for ½″ thickness and 4.04 for ⅝″ thickness. Resistances are based on vertical application, inside still air film, board thickness with one reflective surface facing a ¾″ min. air space.



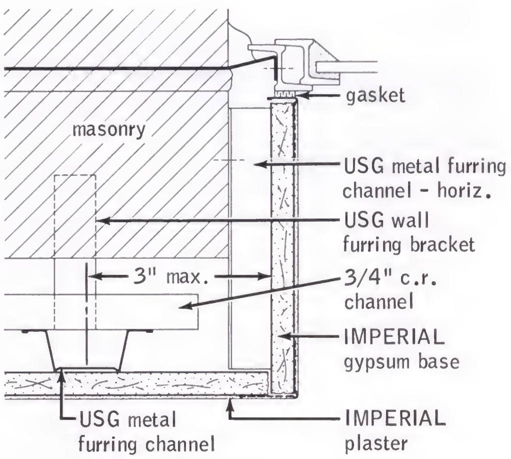
USG metal furring channel

ceiling attachment



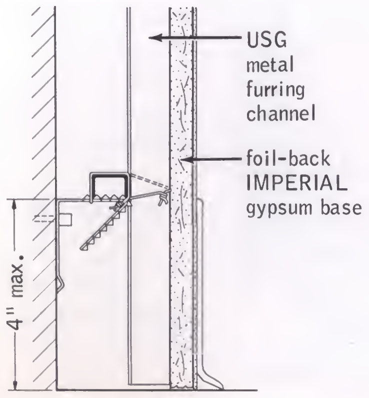


elevation—vertical application

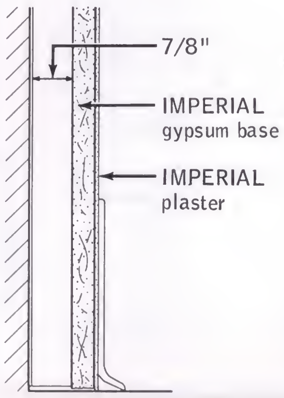


metal window jamb

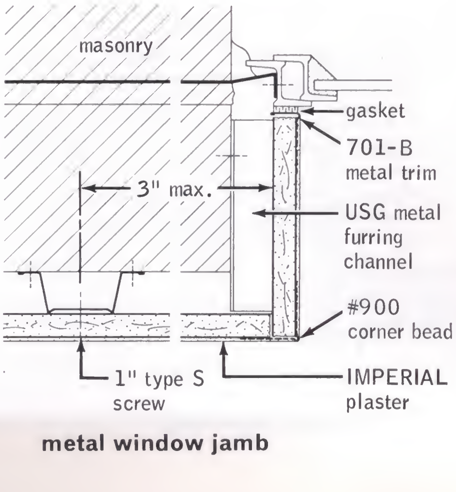
floor attachment



top set



top set



metal window jamb

USG Z-Furring Channels

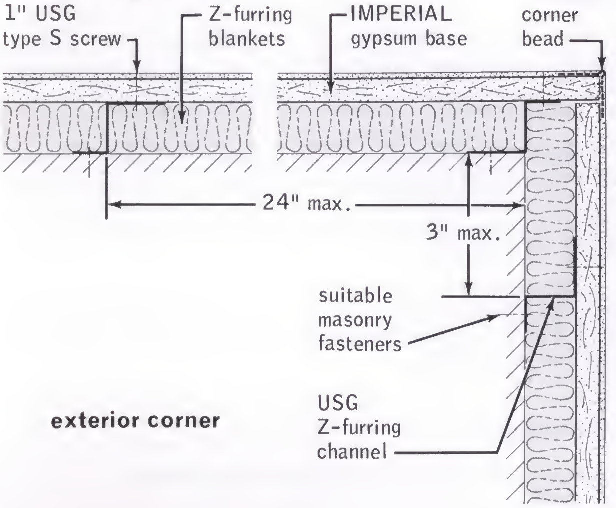
In this assembly, USG Z-Furring Channels are used to mechanically attach THERMAFIBER Z-Furring Blankets or plastic foam insulation to exterior walls. IMPERIAL Gypsum Base is screw-attached to the channels and finished with a thin veneer of high-strength IMPERIAL Plaster. USG Z-Furring Channels, suitable for 1″ to 3″ thick insulation, are formed from hot-dipped galvanized steel for added corrosion resistance.

This system provides a self-furred solid backup for IMPERIAL Base. The surface membrane is isolated to a great degree from the exterior wall. Fire-resistant THERMAFIBER Z-Furring Blankets provide a noncombustible assembly and offer low heat transmission. Blankets are a semi-rigid spun mineral-fiber mat, 1″ thick, meeting the requirements for Class A construction. For other applications, polystyrene and urethane rigid foam insulations offer a range of thicknesses and insulating values. Thermal insulation values (U-factors) for various assemblies are shown below. IMPERIAL Plaster, applied over the gypsum base in one or two coats, offers a strong abrasion-resistant interior surface.

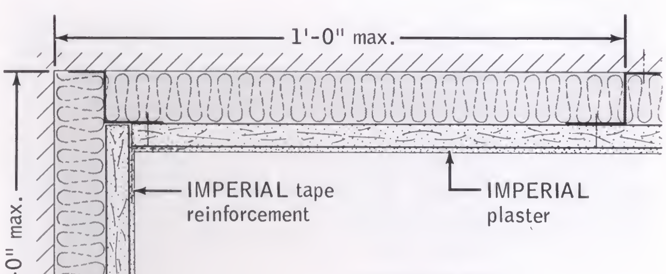
wall construction	nom. wall thickn.	unfin. wall	furred wall (1) (no. insul.)	wall insulated with									
				THERMAFIBER Z-Furring Blkts. (2)				rigid polystyrene (3)				rigid urethane (4)	
				1″	1½″	2″	3″	1″	1½″	2″	3″	1″	1½″
4″ face brick 8″ block	12″	.42	.26	.14	.11	.09	.07	.15	.12	.09	.07	.11	.08
4″ face brick 4″ com. brick	8″	.48	.28	.15	.12	.09	.07	.16	.12	.10	.07	.11	.08
poured conc. 140 lb./cu. ft.	8″	.69	.34	.17	.13	.10	.07	.18	.13	.11	.07	.12	.08
conc. block, sand & gravel aggregate	8″	.51	.29	.15	.12	.10	.07	.17	.13	.10	.07	.11	.08
	12″	.47	.28	.15	.12	.10	.07	.16	.12	.10	.07	.11	.08

(1) Interior wall finish: ½″ IMPERIAL Base and Plaster. (2) k equals 0.24 for 1″ thickness, 0.25 for other thicknesses. (3) k equals 0.26. (4) k equals 0.15. All U-factors expressed in Btu/sq. ft./hr/°F, 75°F mean insulating temperature. Values based on 1965-6 ASHRAE Guide and winter condition (15 mph wind).

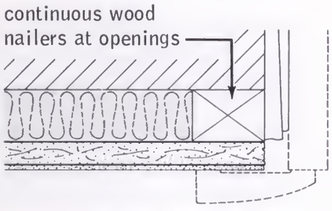
wall plan sections



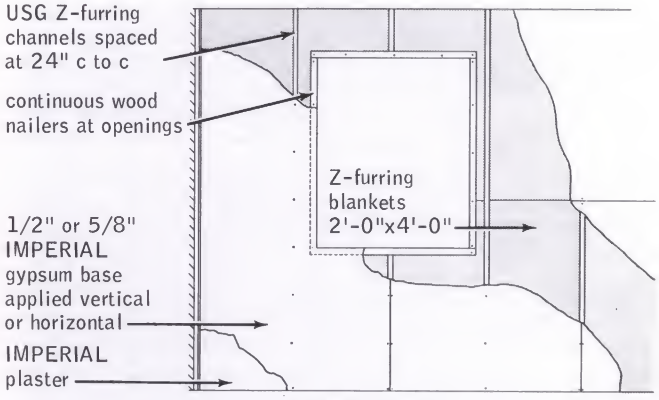
exterior corner



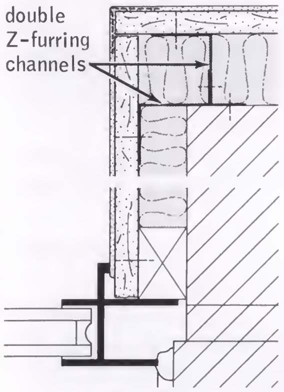
interior corner



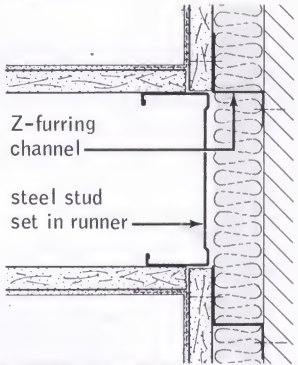
jamb cross-section


USG Z-furring channels spaced at 24" c to c
continuous wood nailers at openings
Z-furring blankets 2'-0"x4'-0"
1/2" or 5/8" IMPERIAL gypsum base applied vertical or horizontal
IMPERIAL plaster

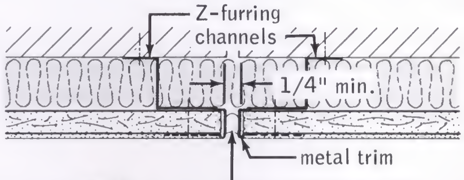
wall elevation



jamb



partition wall intersection



wall control joint

specifications

notes to architect

1. *U.S.G. will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on U.S.G. products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.*

2. *Metal door and borrowed-light frames should be at least 16-ga. steel, shop primed, and have throats accurately formed to overall thickness of partition. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchor clips should be 18-ga. steel welded in jamb (see details, page 4). Stud reinforcing described below is screw-attached to jamb anchor clips. Three-piece frames may also be used with these partitions.*

For hollow-core doors up to 2′8″ wide (5 psf max.), ST5 steel studs and runners may be used for framing the opening. For solid-core doors and hollow-core doors 2′8″ to 4′0″ wide (10 psf max.), rough framing should be ST10 steel studs and runners. For doors over 4′0″ wide, double doors and extra-heavy doors such as used for X-ray rooms (15 psf max.), two ST10 studs placed back-to-back should be used.

For added door frame restraint, spot-grouting at the jamb anchor clip is recommended. Spot-grouting is required for solid-core doors and doors over 2′8″ wide. Apply DURABOND or USG Ready-Mixed Joint Compound just before inserting gypsum base into frame; do not terminate base against trim return. Plaster should be grooved at frame.

3. *Gypsum base surfaces should be isolated with control joints or other means where:* **(a)** *partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling;* **(b)** *a ceiling abuts a structural element; dissimilar wall or partition or other vertical penetration;* **(c)** *construction changes within the plane of the partition or ceiling;* **(d)** *partition or furring run exceeds 30′;* **(e)** *ceiling dimensions exceed 50′ in either direction;* **(f)** *the area within separate ceiling sections exceed 900 sq. ft.;* **(g)** *expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.*

4. *Penetrations of the lath-and-plaster diaphragm, such as door frames and borrowed-light openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.*

5. *Additional chases can be provided in steel studs (except in fire-rated construction) by cutting round holes up to ¾ of stud width, spaced 12″ apart.*

6. *Shallow electrical outlet boxes are recommended when rigid insulation less than 1½″ thick is used.*

7. Fixture Attachment—*Lightweight fixtures and trim should be installed by drilling and inserting expandable anchors in gypsum base for attachment screws. Wood or metal mounting strips for cabinets and shelving should be attached with toggle bolts through the gypsum base near studs.*

8. Ceramic Tile—*IMPERIAL Gypsum Base is not recommended as a base for the adhesive application of ceramic, metal and plastic tile. SHEETROCK W/R Gypsum Panels are recommended for this use (see U.S.G. Product Folder SA-927 in this series on Gypsum Panels).*

9. *Where these partitions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the partition. Back-to-back penetrations of the diaphragm and flanking paths should be eliminated. Door and borrowed-light openings are not recommended in sound control partitions.*

10. *In ceilings, spacing of hangers and channels is designed to support only the dead load. Heavy concentrated loads should be independently supported. To prevent objectional sag in the gypsum base ceiling, the weight of overlaid unsupported insulation should be limited to a uniform load of 1.2 psf for ½″ thick base and 1.4 psf for ⅝″ thick base. A vapor barrier should be installed in all exterior ceilings, and the plenum or attic space vented with a min. ½-sq. in. net free vent area per sq. ft. of horizontal surface.*

11. *All lime-putty finishes applied over IMPERIAL Basecoat Plaster must be properly sealed before decorating. IMPERIAL Finish Plaster and DIAMOND Interior Finish may be painted the day after application with acrylic, latex or vinyl breather-type paints.*

12. *Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.*

13. *During periods of low outside temperature, condensation may form on exterior walls, collecting airborne dirt to produce photographing or shadowing over fasteners and furring. This is a natural phenomenon which occurs through no fault in the products.*

14. *See U.S.G. product folders in this series: Gypsum Plasters, Bases & Accessories Folder SA-917 for general lathing and plastering specifications; Paint Products Folder SA-933 for paint specifications.*

15. Warning: Rigid foam (cellular plastic) insulation is combustible and may constitute a fire hazard if improperly used or installed. It should not be exposed or inadequately protected. Use only as directed by the specific instructions accompanying the product.

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather, all glazing shall be completed and the building heated to a minimum of 55°F. before gypsum base installation. Air circulation shall be kept at a minimum level during veneer plastering until the finish is dry.

b. When low humidity, high temperatures and rapid drying conditions exist during gypsum base and plaster application, Durabond Joint Compound and Perf-A-Tape Reinforcement shall be used on all joints and internal corners and allowed to set and dry thoroughly before plaster application.

Part 2: products

2.1 materials

a. Imperial Gypsum Base (½″) (⅝″) thick, 48″ wide, square edge, (Regular) (Foil-Back) (Firecode) (Firecode "C").
b. Laminating Adhesive—Durabond Joint Compound-Taping or 90 mixed in accordance with manufacturer's directions (for double-layer application).
c. Fasteners—⅜″, ⅞″, 1″, 1¼″, 1 5/16″, 1⅝″ and 2¼″ USG Brand Type S Screws; 1½″ USG Brand Type G Screws.
d. USG Steel Studs—158ST5 (1⅝″), 20ST5 (2″), 212ST5 (2½″), 30ST5 (3″), 358ST5 (3⅝″), 40ST5 (4″), 60ST5 (6″), 20ST10 (2″), 212ST10 (2½″), 30ST10 (3″), 358ST10 (3⅝″), 40ST10 (4″), 60ST10 (6″), 35ST8 (3½″), 35ST10 (3½″), lengths as required.
e. USG Steel Runners—158CR5 (1⅝″), 20CR5 (2″), 212CR5 (2½″), 30CR5 (3″), 358CR5 (3⅝″), 40CR5 (4″), 60CR5 (6″), 20CR10 (2″), 212CR10 (2½″), 30CR10 (3″), 358CR10 (3⅝″), 40CR10 (4″), 60CR10 (6″), 35CR8 (3½″), 35CR10 (3½″).
f. USG Metal Angle Runner, 1⅜″ x ⅞″ x 24-ga.
g. USG Metal Furring Channel and Clips.
h. Imperial Tape—(Type P) (Type S) for joint reinforcement.
i. USG Cold-Rolled Channels (¾″) (1½″).
j. USG Adjustable Wall Furring Bracket.
k. Accessories—USG (#800) (#900) Corner Bead, (701-A) (701-B) (801-A) (801-B) Metal Trim, (P-1) (P-2) Vinyl Trim, Control Joint #093, 16-ga. Tie Wire.
l. Thermafiber (Sound Attenuation) (Z-Furring) Blankets.
m. USG Z-Furring Channel (1″), (1½″), (2″), (3″).
n. USG Acoustical Sealant.
o. Durabond Joint Compound and Perf-A-Tape Reinforcement.

Part 3: execution

3.1 steel stud partition system erection

Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2″ from each end and spaced 24″ o.c., or to suspended ceilings with toggle or molly bolts spaced 16″ o.c.

Position studs vertically, engaging floor and ceiling runners, and spaced (16″) (24″) o.c. When necessary, splice studs with 8″ nested lap and one positive attachment per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are installed directly to exterior walls and possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.

Anchor all studs adjacent to door and window frames, partition intersections, and corners to ceiling and floor runner flanges with USG Metal Lock Fastener tool. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bolt or screw attachment (not required for frames with structural bar struts). Over metal door and borrowed-light frames, place a cut-to-length section of runner track, with a web-flange bend at each end, horizontally and secure with one positive attachment per flange. Position a cut-to-length stud (extending to the ceiling runner) at the location of vertical joints over door frame header.

3.2 single layer gypsum base erection

Apply gypsum base (vertically) (horizontally). Position all edges over stud flanges for vertical application; all ends over stud flanges for horizontal application. To maintain a true surface plane, arrange direction of application so leading edge of base is attached first to open edge of stud flange. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.

For vertical application of base, space screws 12″ o.c. in field of base and 8″ o.c. staggered along vertical abutting edges. For horizontal base application, space screws 12″ o.c. in field and along abutting end joints.

3.3 double layer gypsum base erection

For screw attachment, space screws 16″ o.c. for both layers. Apply both layers of gypsum base vertically with joints in face layer offset from base layer joints. For ⅝″ base, use 1″ screws for base layer and 1⅝″ screws for face layer. For ½″ base, use ⅞″ screws for base layer and 1 5/16″ screws for face layer.

In double-layer laminated construction, attach base layer with 1″ Type S Screws spaced 8″ o.c. at joint edges and 12″ o.c. in field. Apply face layer vertically with Durabond Joint Compound-Taping or 90 spread on back side, joints staggered approx. 12″ and fastened to base layer with 1½″ Type G Screws. Drive screws approx. 2′ from ends and 4′ o.c. in field of panel, 1′ from ends and 3′ o.c. along a line 3″ from vertical edges.

3.4 chase wall erection

Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stub nails or power-driven anchors 24″ o.c., to suspended ceilings with toggle or molly bolts 16″ o.c., or to wood framing with suitable fasteners 24″ o.c.

Position steel studs vertically in runners, (16″) (24″) o.c., with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Anchor all studs adjacent to door and window frames, partition intersections and corners to floor and ceiling runner flanges with USG Metal Lock Fastener tool.

Cut cross bracing to be placed between rows of studs from gypsum base, 12″ high by wall width. Space braces 48″ o.c. vertically and attach to stud webs with six Type S Screws per brace. If larger braces are used, space screws 8″ o.c. max. on each side. Attach single-layer or base-layer gypsum base with (⅞″) (1″) Type S Screws spaced 12″ o.c. in field and 8″ o.c. staggered at vertical joints.

Bracing of 2½″ steel studs may be used in place of gypsum braces. Anchor web at each end of steel brace with two ⅜″ pan head screws. When chase wall studs are not opposite, install steel stud cross braces 24″ o.c. horizontally and securely anchor each end to a continuous horizontal 2½″ runner screw-attached to chase wall studs within the cavity.

3.5 ceiling grillage erection

Space 8-ga. hanger wires 48″ o.c. along carrying channels and within 6″ of ends of carrying-channel runs. In concrete, anchor hangers by attachment to reinforcing steel, by loops embedded at least 2″ or by approved inserts. For steel construction, wrap hanger around or through beams or joists.

Install 1½″ carrying channels 48″ o.c., and within 6″ of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel. Provide 1″ clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12″ and secure each end with double-strand 16-ga. tie wire.

Erect metal furring channels at right angles to 1½″ carrying channels or main support members. Space furring (16″) (24″) o.c. and within 6″ of walls. Provide 1″ clearance between furring ends and abutting walls and partitions. Secure furring to carrying channels with clips or saddle-tie to supports with double-strand 16-ga. tie wire. At splices, nest furring channels at least 8″ and securely wire-tie each end with double-strand 16-ga. tie wire.

At light troffers or any openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore lateral stability of grillage.

3.6 ceiling panel installation

Apply gypsum base of maximum practical length face down with long dimension at right angles to furring channels. Position end joints over channel web and stagger in adjacent rows.

Fit ends and edges closely, but not forced together. Fasten base to channels with 1″ Type S Screws spaced 12″ o.c. in field of base and along abutting ends and edges.

3.7 caged beam fireproofing

Position ceiling runners at least ½″ from and parallel to beam, and fasten to floor units with ½″ Type S-12 Pan Head Screws spaced 12″ o.c. Fabricate hanger brackets from 1⅝″ steel runners allowing 1″ clearance at bottom of beam. Space brackets 24″ o.c. along beam and attach to ceiling runners with ½″ Type S-12 Screws. Install lower corner runners parallel to beam and fasten to brackets with ½″ Type S-12 Screws.

Screw-attach three layers of ⅝″ Imperial Firecode Gypsum Base to channel brackets installing vertical panels first, with bottom panels overlapping lower edges of vertical panels in each layer. Attach panels to channel brackets with 1″ Type S Screws 16″ o.c. for base layer, 1⅝″ Type S Screws 12″ o.c. for middle layer and 2¼″ Type S Screws 8″ o.c. for face layer. Install wire mesh over bottom middle layer panel, extend 1½″ up each side and fasten with 1⅝″ screws used to fasten panels.

3.8 wall furring channel attachment—direct

Attach metal furring channels vertically, spaced (16″) (24″) o.c., to masonry or concrete surfaces with hammer-set or power-driven fasteners or concrete stub nails staggered 24″ o.c. on opposite flanges. Where furring channel is installed directly to exterior wall and a possibility of water penetration through walls exists, install asphalt felt protection strip between furring channel and wall.

3.9 wall furring channel attachment—bracketed

Attach adjustable wall furring brackets with serrated edges up, 36″ o.c. horizontally, 48″ o.c. vertically, within 4″ of columns or other abutting construction, within 6″ of floor and ceiling, and as required above and below windows, with (2″ cut nail in mortar joints of brick, clay tile or concrete block, or in field of lightweight aggregate blocks) (⅝″ concrete stub nails, power-driven nails or other suitable fasteners in poured concrete). Place fastener in top hole of bracket. Lay cold-rolled channels horizontally with flanges down, on furring brackets, plumb with other channels, and tie with double-strand 16-ga. or triple-strand 18-ga. wire, bend down excess bracket length. Erect metal furring channel vertically, spaced (16″) (24″) o.c. and tie with double-strand 16-ga. or triple-strand 18-ga. wire at each channel junction.

At outside corner, attach gypsum base to short horizontal mitered furring channels or to a vertical steel stud.

3.10 Z-furring channel attachment

Erect insulation vertically and hold in place with Z-furring channels spaced 24″ o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24″ o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner; start from this furring channel with a 3″ strip of insulation followed by furring channel in the normal manner. At interior corners, space second channel no more than 12″ from corner and cut insulation to fit. Hold insulation in place until gypsum base is installed with 10″ long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel. Apply wood blocking around window and door openings and as required for attachment and support of fixtures and furnishings.

Apply gypsum base (vertically) (horizontally) with vertical joints occurring over channels. Attach gypsum base with 1″ Type S Screws spaced 12″ o.c. in field and at edges, and with 1¼″ Type S Screws spaced 12″ o.c. at exterior corners. Use Durabond Compound and Perf-A-Tape Reinforcement on all joints, interior corners, trim and corner beads and allow to set and dry thoroughly before finish plaster application.

3.11 accessory application

When low humidity, high temperatures and rapid drying conditions exist, use Durabond Joint System on all joints and internal corners and allow to set and dry thoroughly before applying finish plaster.

a. Reinforcing Tape—Apply over full length of all gypsum base joints; do not overlap at intersections.

Type P Tape—Firmly press along entire length to insure firm wrinkle-free attachment.

Type S Tape—Apply with spring-driven stapler using ⅜″ staples. Use two staples at each end of tape and stagger intermediate staples 24″ along length of tape. At wall-ceiling intersections and interior corners, staple tape 24″ o.c. along ceiling edge or on one edge only.

b. Laminating Adhesive—Spread to provide ½″ adhesive beads 4½″ o.c. for full sheet lamination. For strip lamination, apply adhesive in vertical strips of four ½″ beads 1½″ to 2″ o.c. Space strips 24″ o.c.

c. Corner Bead—Reinforce all vertical and horizontal exteriors corners with corner bead fastened with 9/16″ rosin-coated staple 12″ o.c. on both flanges along entire length of bead.

d. Casing Bead—Where wall or partition terminates against masonry or other dissimilar material, apply metal trim over gypsum base and fasten with 9/16″ rosin-coated staples 12″ o.c.

e. Screws—Power-drive and set so screwhead is flush with surface of gypsum base without tearing through face paper.

f. Control Joints—Break gypsum base behind joint and back by double studs or furring channels. Attach control joint to gypsum base with 9/16″ rosin-coated staples spaced 12″ o.c. on both flanges along entire joint length.

g. P-1 Vinyl Trim—Slip trim over gypsum base with long flange behind base. Install base with trim firmly abutting surface.

h. P-2 Vinyl Trim—Provide ⅛″ to ⅜″ relief for trim at gypsum base angle. Remove protective paper from adhesive on web of trim and insert trim into relief, adhesive against wall surface. Press upward until long flange seats against ceiling.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, IMPERIAL, DIAMOND, STRUCTO-GAUGE, SHEETROCK, THERMAFIBER, DURABOND, PERF-A-TAPE, FIRECODE.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

Veneer Plaster and Wood Framing

system folder

partition applications

fire rating	description	test no.	stc rating 11-f	stc rating 16-f	comments
1 hr. est	Wd Stud—Resil ⅝″ IMPERIAL gypsum base & veneer plaster—2x4 16″ o.c.—2 layers base one side screw att & lamin—single layer opp side screw att to RC-1 chan —3″ THERMAFIBER ins blkts—1⁄16″ veneer plaster both sides—perimeter caulked wt 11 width 6⅛″	CK-654-38 (s)		53	Fire rating based on UL Des U311
1 hr.	Wd Stud—Resil ⅝″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster—2x4 16″ o.c.—3″ THERMAFIBER ins blkts—RC-1 chan one side spaced 24″ o.c.—base att with 1″ Type S screws—opp side att direct with 1¼″ Type W screws—1⁄16″ veneer plaster both sides—perimeter caulked wt 8 width 5½″	UL Des U311 (f) (was 27-1 hr) CK-664-4 (s) USG-111-FT-G&H (s)	50	49	Good sound isolation combined with highly abrasion-resistant surface. CK-664-4 based on ½″ plaster base
1 hr.	Wd Stud—½″ IMPERIAL FIRECODE "C" gypsum base att direct & veneer plaster—2x4 16″ o.c.—base nailed 7″ o.c. 6d nails—1⁄16″ veneer plaster—joints taped wt 7 width 4¾″	U of C 10-27-64 (f)	N/A		Excellent surface hardness and abrasion resistance
1 hr.	Wd Stud—⅝″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster—2x4 16″ o.c.—base nailed 7″ o.c. 1⅞″ cem ctd nails—1⁄16″ veneer plaster both sides—joints taped wt 7 width 5″	UL Des U305 (f) (was 5-1 hr)	N/A		
2 hrs.	Wd Stud—2 layers ⅝″ IMPERIAL FIRECODE "C" gypsum base & 1⁄16″ veneer plaster both sides—2x4 16″ o.c.—base layer 6d nails 6″ o.c.—face layer lamin or nailed to base—joints taped wt 12 width 6¼″	UL Des U301 (f) (was 4-2 hr)	N/A		Basic 2-hour partition construction

NOTE: Partition widths based on 3⅝″ stud width.

ceiling applications

fire rating	description	test no.	sound rating STC	sound rating IIC	comments
1 hr.	½″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—wd joist 2x10 16″ o.c.—1″ nom wd sub & fin flr—pl base att with 5d nails 6″ o.c.—1⁄16″ veneer plaster—joints taped clg wt 3	UL Des L512 (f) (was 42-1 hr)	N/A		Fire rating also applies with ¾″ MASTICAL underlayment compound over plywood subfloor
1 hr.	Resil ½″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—wd joist 2x10 16″ o.c.—1″ nom wd sub & fin flr—RC-1 chan spaced 16″ o.c. and at end joints—pl base att with Type S screws 12″ o.c.—1⁄16″ veneer plaster—joints taped clg wt 3	UL Des L514 (f) (was 41-1 hr)	N/A		Fire rating also applies with ¾″ MASTICAL underlayment compound over plywood subfloor
1 hr.	⅝″ IMPERIAL FIRECODE gypsum base & veneer plaster ceiling—Amer Plywood Assn 2-4-1 flr 4x10 wd joist 48″ o.c.—USG met fur chan—pl base att with 1″ Type S screws—1⁄16″ plaster—joints taped clg wt 3	UL Des L508 (f) (was 28-1 hr)	N/A		Only 1-hr. residential veneer plaster system based on 48″ joist spacing
1 hr.	⅝″ IMPERIAL FIRECODE gypsum base & veneer plaster ceiling—1″ nom wd sub & fin flr—2x10 wd joist 16″ o.c.—pl base att with 6d nails 6″ o.c.—1⁄16″ veneer plaster—joints taped clg wt 3	UL Des L501 (f) (was 1-1 hr)	N/A		
2 hrs.	Resil 2 layers ⅝″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—1″ nom wd sub & fin flr —2x10 wd joist 16″ o.c.—RC-1 chan screw att over base layer—face layer screw att to chan 12″ o.c.—1⁄16″ veneer plaster—joints taped clg wt 5	UL Des L511 (f) (was 272-2 hr)	N/A		

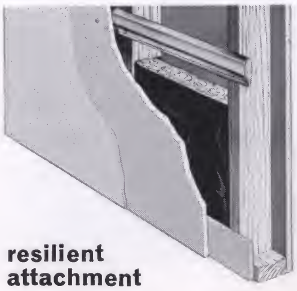
description

In these systems, a veneer (1⁄16″ to 3⁄32″ thick) of specially formulated gypsum plaster is applied in one coat over IMPERIAL Gypsum Base attached to wood framing. DIAMOND Interior Finish, offering superior coverage and workability, provides economical surfaces with outstanding beauty and durability. Higher-strength IMPERIAL Finish Plaster provides abrasion and crack-resistant walls and ceilings of exceptional hardness. IMPERIAL Basecoat Plaster may be used as a superior base in a two-coat system for either finish. IMPERIAL Base, 4 ft. wide, has a high-strength, high-density core, either regular, FIRECODE or FIRECODE "C" type, covered with special absorption face paper designed for veneer plastering. Veneer finish systems, as outlined below, are suitable for partitions and ceilings wherever standard plaster or drywall systems are used.

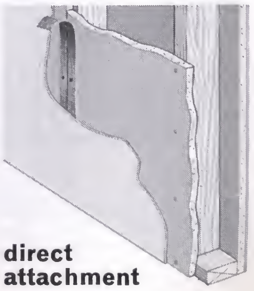
Partitions—Versatile IMPERIAL Gypsum Base is directly attached to wood studs with USG Brand Type W Screws or nails. Where a 2-hour fire rating is required, double-layer FIRECODE "C" Base is used. To provide superior sound control, IMPERIAL Base is resiliently attached to one side of wood studs using the RC-1 Resilient Channel. Base is fastened to channels with power-driven USG Brand Type S Screws. This system with THERMAFIBER Insulating Blankets stapled in the stud cavity, provides one of the most economical party walls.

Ceilings—High-quality, fire-resistant ceilings are rapidly installed with IMPERIAL Base applied directly to wood joists or over resilient channels for added sound control. With

(continued on page 2)



resilient attachment



direct attachment

UNITED STATES GYPSUM
1977-1

9P LATH & PLASTER
system—wood frame, veneer gypsum

description *(continued from page 1)*

double-layer base separated by resilient channels, a 2-hour fire rating is provided.

IMPERIAL Gypsum Base and Plaster are also used with steel studs and furring channels for noncombustible interior partitions, party walls, chase walls and furring (see System Folder SA-912 in this series for details).

function and utility

Veneer finish systems are ideal for load-bearing interior partitions and ceilings in residences, motels, garden apartments and other multi-family buildings requiring fire protection plus these extra features:

Durability—The high-strength (approx. 3,000 psi), abrasion- and crack-resistant features of IMPERIAL Plaster offer the durability needed in high-traffic areas, and obtainable with few other materials.

Fire Resistance—2 hours with double-layer ⅝″ FIRECODE "C" Base; 1-hour rating using single-layer base in walls and ceilings (see table, page 1).

Sound Control—The systems offer sound isolation up to 53 STC with the use of resilient channels and insulating blankets; suitable for party walls (see table, page 1).

Fast Completion—Veneer finishes are easily applied, eliminate drying delays and are usually ready for next-day decorating or painting with breather-type paints. The white surface obtainable with DIAMOND Finish, particularly when sand-floated or textured, is often acceptable without further decoration.

Economy—Simple, inexpensive components erect quickly at a lower cost than conventional plaster systems. Speedy plaster application plus savings in decorating time make these systems competitive to drywall assemblies in many instances.

limitations

1. These constructions should not be used where normally exposed to excessive moisture, humidity or temperature.

2. Type S Screws must be used for attachment of single-layer base to RC-1 Resilient Channels.

3. RC-1 Resilient Channels must be attached to framing only with 1¼″ Type W Screws. Nails should not be used.

4. Resilient ceilings should not be installed beneath highly flexible floor joists. Install only to framing meeting "Wood Framing Requirements" (see Specifications).

5. Max. framing spacing: 16″; except 24″ for double-layer assemblies and ⅝″ base with two-coat plaster application.

fastener spacing—IMPERIAL Gypsum Base

thickn. of base	framing	type fastener	max. fastener spacing
½″	wood	**Nails** (for regular base)—1¼″, 13 ga., 15/64″ head, ring or barbed shank, blued, bright or cement coated	7″ ceilings 8″ walls
		Nails (for FIRECODE base)—1⅝″ 5d cooler type cement coated	6″ ceilings 7″ walls
with RC-1 channel		**Screws**—1¼″ USG Brand Type W	12″
		Screws—⅞″ USG Brand Type S	12″
⅝″	wood	**Nails** (for regular base)—1⅜″, 13 ga., 15/64″ head, ring or barbed shank, blued, bright or cement coated	7″ ceilings 8″ walls
		Nails (for FIRECODE base)—1⅞″ 6d cooler type cement coated	6″ ceilings 7″ walls
with RC-1 channel		**Screws**—1¼″ USG Brand Type W	12″
		Screws—1″ USG Brand Type S	12″

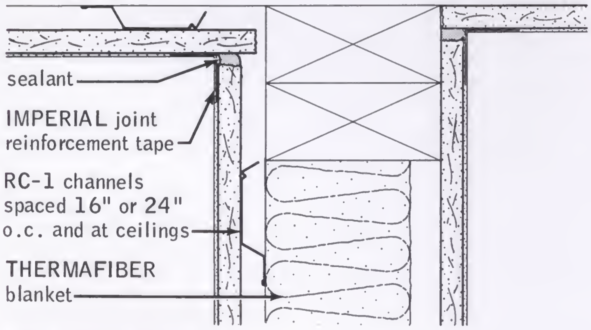
fixture attachment load data

type fastener or attachment		allowable withdrawal resistance—lb.	allowable shear resistance—lb.
fiber or plastic plug	#6 screw	10	40
	#8 screw	15	40
	#10 screw	20	50
	#12 screw	30	60
	#14 screw	30	75
toggle or molly bolt	⅛″ bolt	20	40
	3/16″ bolt	30	50
	¼″ bolt	40	60
no. 8 sheet metal screw into 25-ga. metal sheet		50	100

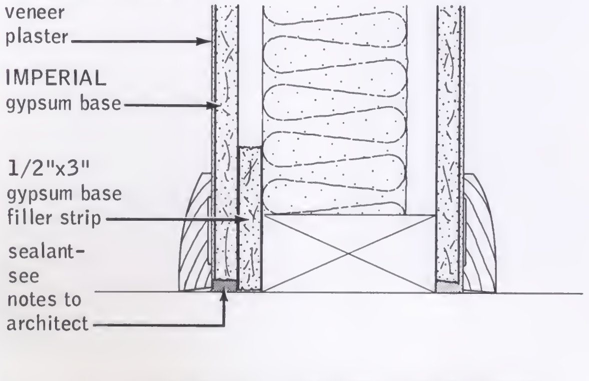
details

scale: 3″=1′-0″

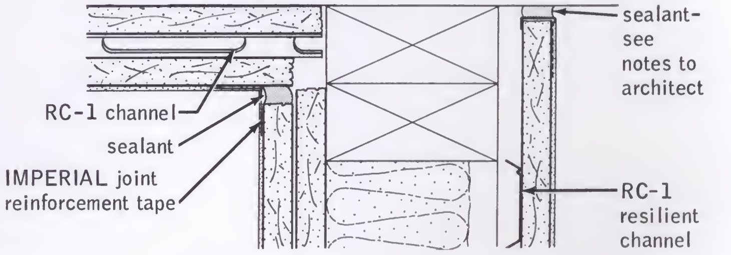
ceiling attachment


sealant
IMPERIAL joint reinforcement tape
RC-1 channels spaced 16" or 24" o.c. and at ceilings
THERMAFIBER blanket

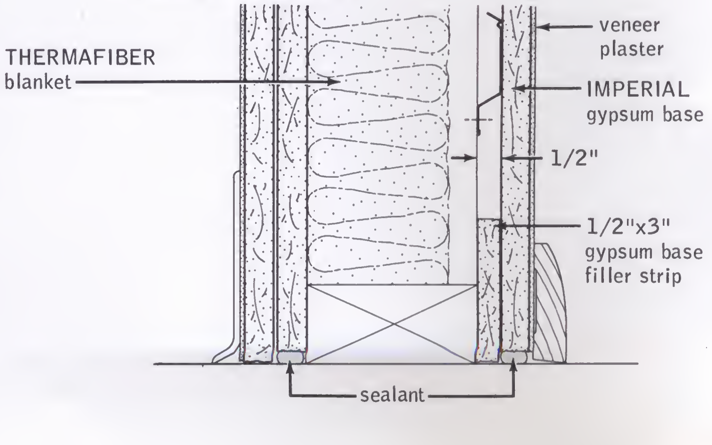
floor attachment


veneer plaster
IMPERIAL gypsum base
1/2"x3" gypsum base filler strip
sealant-see notes to architect

ceiling attachment


sealant-see notes to architect
RC-1 channel
sealant
IMPERIAL joint reinforcement tape
RC-1 resilient channel

floor attachment



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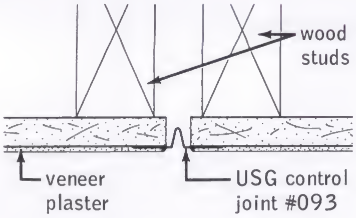
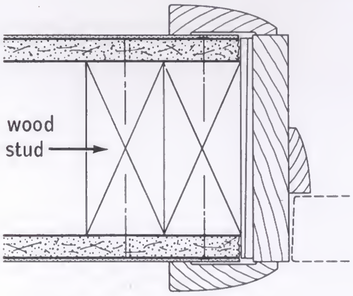
details

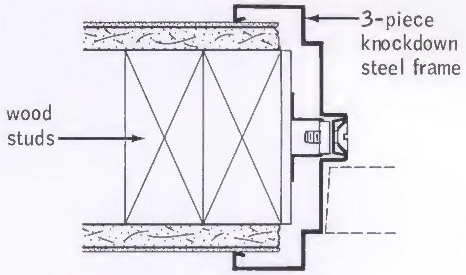
miscellaneous



control joint

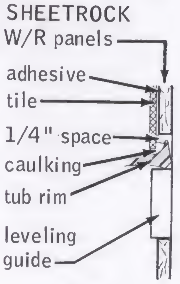


wood door frame

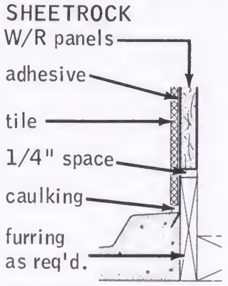


steel door frame

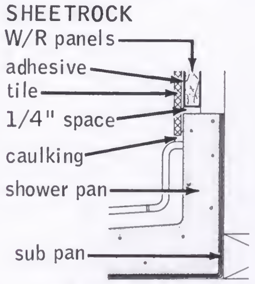
tub and shower details—single-layer SHEETROCK W/R Panels



tub

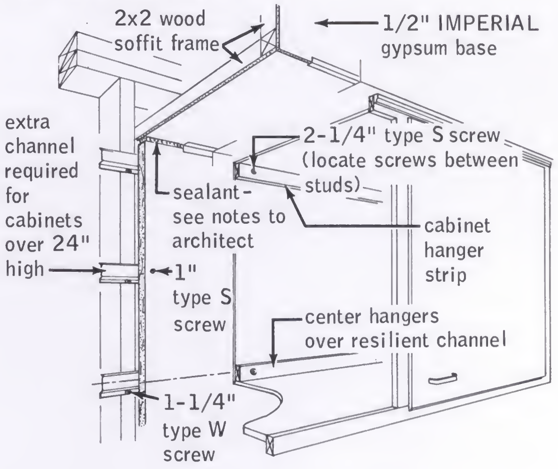


shower receptor

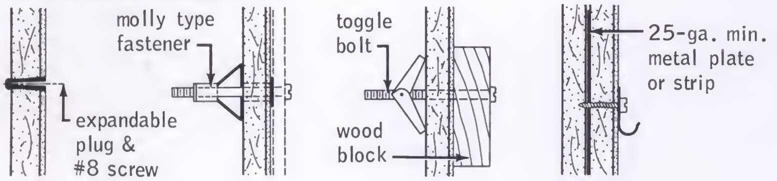


shower pan

cabinet attachment


2x2 wood soffit frame
1/2" IMPERIAL gypsum base
extra channel required for cabinets over 24" high
sealant-see notes to architect
2-1/4" type S screw (locate screws between studs)
cabinet hanger strip
1" type S screw
center hangers over resilient channel
1-1/4" type W screw

fixture attachments (light)



specifications—notes to architect

1. *U.S.G. will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on U.S.G. products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.*

2. *Gypsum base surfaces should be isolated with control joints or other means where:* **(a)** *partition abuts a structural element (except floor) or dissimilar wall or ceiling;* **(b)** *construction changes within the plane of partition or ceiling;* **(c)** *partition run exceeds 30′;* **(d)** *ceiling dimensions exceed 50′ in either direction.*

Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.

3. *Penetrations of the lath-and-plaster diaphragm, such as door and borrowed-light openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.*

4. *To prevent objectionable sag in the gypsum base ceiling, the weight of overlaid unsupported insulation should be limited to a uniform load of 1.2 psf for ½″ thick base and 1.4 psf for ⅝″ base. Foil-back base or a separate vapor barrier should be installed in all exterior ceilings, and the plenum or attic space vented with a min. ½-sq. in. net free area per sq. ft. of horizontal surface.*

5. *Where these partitions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the partitions.*

Back-to-back penetrations of the diaphragm and flanking paths should be avoided. Door and borrowed-light openings are not recommended in sound control partitions.

6. Wood Framing Requirements—*Wood framing meeting the minimum requirements of FHA, ALSC and local building codes is necessary for proper performance.*

7. Ceramic Tile—*IMPERIAL Gypsum Base is not recommended as a base for the adhesive application of ceramic, metal and plastic tile. SHEETROCK W/R Gypsum Panels are recommended for this use (see details).*

8. *All lime-putty finishes applied over IMPERIAL Basecoat Plaster must be properly sealed before decorating. DIAMOND Interior Finish and IMPERIAL Finish Plaster may be painted the day after application with acrylic latex or vinyl breather-type paints.*

9. *Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.*

10. *See U.S.G. product folders in this series: Gypsum Plasters, Bases & Accessories Folder SA-917 for general lathing and plastering specifications; Paint Products Folder SA-933 for paint specifications; Building & Acoustical Insulation Folder SA-705 for insulation specifications.*

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

Veneer Plaster and Wood Framing

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather, all glazing shall be completed and the building heated to a minimum of 55°F. before gypsum base installation. Air circulation shall be kept at a minimum level during veneer plastering until finish is dry.

b. When low humidity, high temperatures and rapid drying conditions exist during gypsum base and plaster application, DURABOND Joint Compound and PERF-A-TAPE Reinforcement shall be used on all joints, internal corners, trim and corner beads and allowed to set and dry thoroughly before plaster application.

Part 2: products

2.1 materials

a. IMPERIAL Gypsum Base—(½″) (⅝″) thick, 48″ wide, (Regular) (Foil-Back) (FIRECODE) (FIRECODE "C").
b. RC-1 SHEETROCK Resilient Channel.
c. 3″ THERMAFIBER Insulating Blankets (size).
d. Fasteners—(choose from page 2).
e. IMPERIAL Tape—(Type P) (Type S) for joint reinforcement.
f. USG No. (800) (900) Corner Bead.
g. USG Trim (701-A) (701-B) (801-A) (801-B) (P-1) (P-2).
h. USG No. 093 Control Joint.
i. USG Acoustical Sealant.
j. PERF-A-TAPE Reinforcement and DURABOND Joint Compound.

Part 3: execution

3.1 gypsum base—direct attachment

Apply IMPERIAL Gypsum Base on ceilings first, (horizontally—right angles to framing) (vertically—parallel to framing). Position all ends over framing in horizontal application; all edges over framing members in vertical application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together.

Stagger end joints in successive courses with joints on opposite sides of partition placed on different studs. Float gypsum base at vertical interior angles by attaching the overlapping sheet of base only, at the angle; at horizontal interior angles by attaching both sheets of base no closer than 8″ from the angle.

Drive fasteners in field of base first, working toward ends and edges. Hold base in firm contact with framing while driving fasteners. Space nails 7″ to 8″ o.c., screws 12″ o.c., and perimeter fasteners not less than ⅜″ from ends or edges. Drive fastener heads flush with surface of base, not dimpled, and without breaking paper. Wherever base is not tight against framing, drive another fastener within 1½″ of first.

Cut base to fit neatly around pipes, electrical outlets, medicine cabinets, etc. Remove any loose face paper at cut and fill gaps or holes with quick-setting plaster.

3.2 gypsum base—resilient attachment

Position RC-1 Resilient Channels at right angles to wood framing, space (16″) (24″) o.c. and attach with 1¼″ type W screws driven through holes in channel mounting flange.

On walls, attach ½″ x 3″ wide continuous filler strips to both sides of bottom plate. Install channels with mounting flange down, top channel max. 6″ down from ceiling, bottom channel (16″) (24″) up from floor. Extend channels into all corners and attach to corner framing.

On ceilings, position first and last channels max. 6″ from wall-ceiling angle. Cantilever channel ends no more than 6″.

Splice channels by nesting directly over framing member; screw-attach through both flanges. Reinforce with screws located at both ends of splice.

Where cabinets will be installed, attach RC-1 Channels to studs at center of top and bottom cabinet hanger brackets. When distance between hangers exceeds 24″ o.c., install additional channel at midpoint between hangers.

Apply IMPERIAL Gypsum Base, ceiling first, with long dimension at right angles to channels, and end joints neatly fitted and centered over channel attachment flange. Attach with (⅞″) (1″) USG Type S Screws spaced 12″ o.c. across each channel and perimeter screws not less than ⅜″ from ends and edges. Support plaster base around all cut-outs and openings.

For double-layer ceiling system, apply base layer with long edges across joists and end joints staggered. Fasten base to framing with 8d cement-coated nails spaced 7″ o.c. Attach resilient channel through base layer perpendicular to framing with 1⅞″ Type S Screws. Install face layer with long dimension across channels using 1″ Type S Screws spaced 12″ o.c.

3.3 accessory application

a. Reinforcing Tape—Apply over full length of all gypsum base joints; do not overlap at intersection.

Type P Tape—Press firmly along entire length to insure firm wrinkle-free attachment.

Type S Tape—Apply with spring-driven stapler using ⅜″ staples. Use two staples at each end of tape and stagger intermediate staples 24″ o.c. along length of tape. At wall-ceiling intersections and interior corners, staple tape 24″ o.c. along ceiling edge or on one edge only.

b. Corner Bead—Attach to all vertical and horizontal exterior corners with nails or 9/16″ rosin-coated staples spaced 12″ o.c. along both flanges along entire length of bead.

c. Casing Bead—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum base and fasten with 9/16″ rosin-coated staples 12″ o.c.

d. Vinyl Trim—Slip USG P-1 Trim over gypsum base with long flange behind base. Install gypsum base with trim firmly abutting surface. For P-2 Vinyl Trim, provide ⅛″ to ⅜″ relief at ceiling perimeter. Remove protective paper from adhesive on web of trim and insert trim into relief, adhesive against wall surface. Press upward until long flange seats against ceiling.

e. Control Joint—Install in direct-mounted face layer. Break base behind joint and back by double studs; attach joint to gypsum base with 9/16″ rosin-coated staples spaced 12″ o.c. on both flanges along entire joint length.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, IMPERIAL, SHEETROCK, THERMAFIBER, PERF-A-TAPE, DURABOND, FIRECODE, DIAMOND, MASTICAL.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606

TRUSSTEEL Studs and Gypsum Lath

system folder

fire rating	description	test no.	stc rating 11-f	stc rating 16-f	comments
1 hr. est	Stl Stud—Resil Gypsum Lath & Plaster—2½″ TRUSSTEEL studs 16″ o.c.—TR-1 clips one side & TL-1 clips opp side—⅜″ ROCKLATH—½″ 100:2 gypsum sand plaster—perimeter caulked wt 12 width 4¾″	TL-69-14 (s)		46	
1 hr. est	Stl Stud—Resil Gypsum Lath & Plaster—3¼″ TRUSSTEEL Studs 16″ o.c.—1½″ THERMAFIBER sound atten blkts—TR-1 clips one side & TL-1 clips opp side—⅜″ ROCKLATH—½″ 100:2-100:2 gypsum sand plaster—perimeter caulked wt 14 width 5½″	USG-125-FT-G&H (s)	49		
		CK-664-38 (s)		52	
		Field Test KSO-1090072-b (s)	47	46	2 caulked outlets on each side in field test
1 hr.	Stl Stud—Resil ½″ IMPERIAL FIRECODE "C" plaster base & veneer plaster—2½″ TRUSSTEEL studs 24″ o.c.—RC-1 chan both sides spaced 16″ o.c. att with ¾″ Type T pan head screws—pl base att with 1″ Type S screws—1/16″ IMPERIAL plaster—joints taped wt 7 width 4⅝″	T-4831-OSU (f)			
		TL-69-278 (s)		48	TL-69-278 based on assembly with 1½″ THERMAFIBER sound attenuation blankets
		TL-69-288 (s)		36	
1 hr. est	Stl Stud—Gypsum Lath & Plaster—2½″ TRUSSTEEL studs 16″ o.c.—⅜″ ROCKLATH—½″ 100:2-100:2 gypsum sand plaster wt 13 width 4½″	TL-58-7 (s)	41		Record of proven performance

For wall furring application, see page 9.

description

In these systems, TRUSSTEEL Studs, gypsum lath and plaster are assembled into hollow, fire-resistant partitions with superior sound control features. With slight variations, they are also suitable for core walls and wall furring.

TRUSSTEEL Studs are made of high-tensile strength wire formed into an exceptionally strong non-load bearing stud. The open web truss design provides a maximum of free space for encasing pipes, conduits or ducts, horizontally, vertically or diagonally, without impairing the structural integrity of the assembly. When attached to floor and ceiling with runner tracks and stud shoes, TRUSSTEEL Studs form superior strength framing for lath and plaster surfaces, as outlined below.

Standard Plaster—⅜″ ROCKLATH Plaster Base serves as a rigid base for ½″ gypsum sand plaster. Lath is either directly attached to studs 16″ o.c. with TRUS-LOK Clips TL-1 or resiliently attached with Resilient Clips TR-1. By using these specially designed resilient clips, the lath and plaster diaphragm is not rigidly coupled to the studs. Excellent sound-isolative efficiency of this system results from this resilient mounting of the plaster membrane and the column of air formed within the TRUSSTEEL Studs (see table above).

Veneer Plaster—½″ IMPERIAL Plaster Base, a gypsum lath in large sheet form, provides a specially designed base for 1/16″ to 3/32″ IMPERIAL Plaster. In this construction, RC-1 SHEETROCK Resilient Channels 16″ o.c. are screw-attached to TRUSSTEEL Studs set into Snap-In Runner Tracks anchored to floor and ceiling. RC-1 Channels are screw-attached to the studs, then faced with IMPERIAL Base screw-attached to the channels. IMPERIAL Plaster is applied after joints and interior angles are reinforced with IMPERIAL Tape. Attachment with specially designed RC-1 Metal Channels isolates the plaster base and plaster diaphragm from the studs. This resilient mounting, along with the use of THERMAFIBER Sound Attenuation Blankets within the cavity, provides excellent sound attenuation for the assemblies.

function and utility

Sound Control—The systems offer sound attenuation suitable for party walls at a low cost (see table above).

Fire Resistance—Noncombustible components provide systems with 1-hour and 2-hour ratings (see table above).

Durability—The high compressive strength (approx. 3,000 psi), abrasion- and crack-resistant features of IMPERIAL Plaster offer the durability needed in high-traffic areas, and obtainable with few other materials.

Strength—TRUSSTEEL Studs are formed of No. 7 gauge cold drawn wire, with a tensile strength of 90,000 psi. The resistance moment computed on the section modulus produces an exceptionally strong non-load bearing steel stud.

Lightweight—These systems weigh appreciably less than masonry partitions of the same thickness.

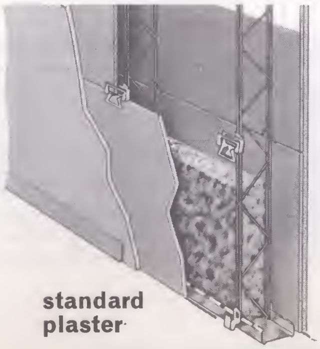
Performance—TRUSSTEEL Studs have been used since 1933 and now account for the majority of all non-load bearing steel studs used nationally. The continued high level of use indicates their acceptance based on their performance.

Economical—Structural integrity, strength, sound isolation, an open core wall and fire protection are provided by TRUSSTEEL Stud partitions at a lower cost than by other noncombustible assemblies.

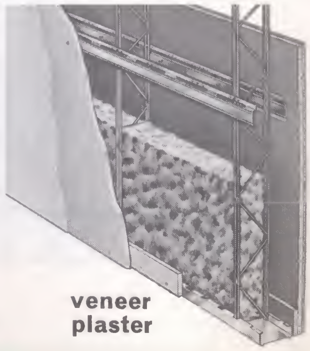
limitations

1. Non-load bearing.
2. Max. spacing: studs for ROCKLATH Base, 16″ o.c.; studs for

(continued on page 2)

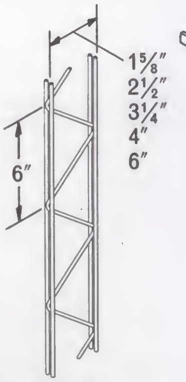


standard plaster

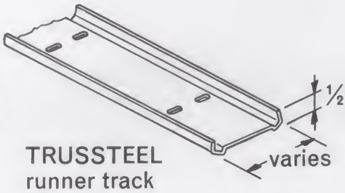


veneer plaster

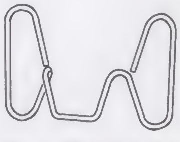
components/technical data



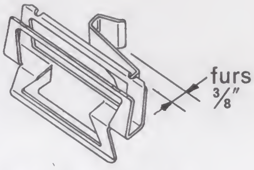
TRUSSTEEL stud



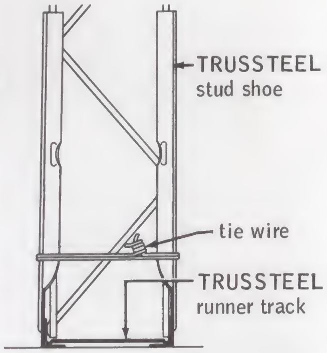
TRUSSTEEL runner track

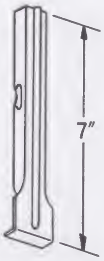


TL-1 TRUS-LOK field clip

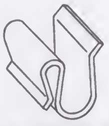


TR-1 resilient clip

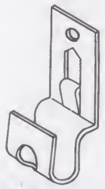




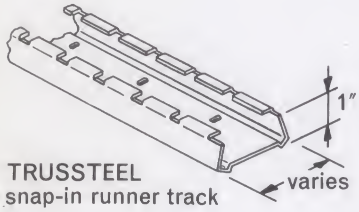
TRUSSTEEL stud shoe



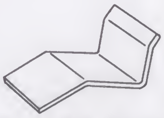
TL-2 TRUS-LOK starter clip



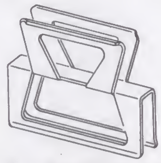
R-SF resilient starter-finisher clip



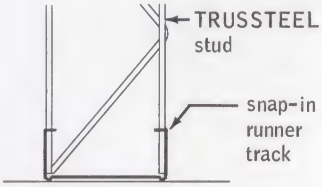
TRUSSTEEL snap-in runner track



TRUS-LOK drive-in starter clip



B-1 BRIDJOINT field clip



see "plaster bases" product catalog for full description on accessories & sizes

limitations *(continued from page 1)*

IMPERIAL Base, 24″ o.c.; resilient channel for IMPERIAL Base, 16″ o.c. (see tables at right, for limiting height).

3. Door frames must be fabricated and anchored to prevent twisting and impact vibration (see details, pages 7 and 8).

4. To retain maximum sound isolation, precautions must be taken to prevent sound leakage (see Specifications).

5. Where mechanically suspended acoustical tile ceilings are used, finished partitions should extend from structural slab to structural slab, closing all openings.

6. ROCKLATH Base and standard plaster should be applied to only one side of TRUSSTEEL Studs with TR-1 Clips; use TL-1 Clips to attach ROCKLATH on other side.

7. With resilient channel systems, 1⅝″ TRUSSTEEL Studs are recommended for wall furring applications only, not for partitions. These systems are not recommended for use where exposed to abnormal moisture or excessively high humidity.

standard plaster
finished partition thickness—limiting heights

stud width	section modulus	direct attach.	resil. attach.	max. partition heights studs 16″ o.c. (2)(3)
1⅝″	.0635″³	3⅝″	(1)	9′
2½″	.1056″³	4½″	4¾″	15′
3¼″	.1420″³	5¼″	5½″	21′
4″	.1825″³	6″	6¼″	22′
6″	.277″³	8″	8¼″	26′

(1) Not recommended for resilient attachment. (2) Resilient partition limiting height is 10′. (3) Limiting heights based on L/360 deflection.

veneer plaster
finished partition thickness—limiting heights

stud width (in.)	partition width (in.)	stud spacing (in.)	max. partition height (1)		
			(2)	(3)	(4)
2½	4¾	16 24	10′9″ 9′6″	9′6″ 8′6″	7′6″ —(5)
3¼	5½	16 24	13′0″ 11′6″	11′6″ 10′0″	9′3″ 8′0″
4	6¼	16 24	15′3″ 13′3″	13′6″ 11′9″	10′9″ 9′3″
6	8¼	16 24	20′9″ 18′0″	17′6″ 15′3″	14′0″ 12′3″

(1) Limiting deflection criteria = L/360. (2) Max. height allowable where no superimposed load is applied perpendicular to partition. (3) Max. height allowable where a 5 psf uniform load is applied perpendicular to partition. (4) Max. height allowable where a 10 psf load is applied perpendicular to partition. (5) Limiting height is less than accepted standard.

sound transmission loss—db

test no.	method	band center frequency—Hz																					STC
		125	160	175	200	250	315	350	400	500	630	700	800	1000	1250	1400	1600	2000	2500	2800	3150	4000	
USG-125FT-G&H	Lab	35	—	49	—	49	—	52	—	56	—	56	—	59	—	49	—	48	—	54	—	60	49
KSO-1090072-b	Field	35	—	37	—	46	—	46	—	49	—	53	—	55	—	47	—	47	—	54	—	60	47
		34	37	—	40	46	46	—	44	48	52	—	53	55	47	—	42	47	51	—	56	60	46
TL-69-14	Lab	28	31	—	35	38	41	—	44	48	51	—	54	55	51	—	42	42	47	—	50	54	46
CK-664-38	Lab	36	44	—	47	48	49	—	50	50	50	—	51	52	51	—	50	52	53	—	55	56	52
TL-69-278	Lab	24	30	—	36	40	44	—	49	52	54	—	55	56	57	—	54	45	45	—	50	53	48
TL-69-288	Lab	17	20	—	24	25	27	—	31	35	39	—	44	47	49	—	45	37	37	—	43	46	36

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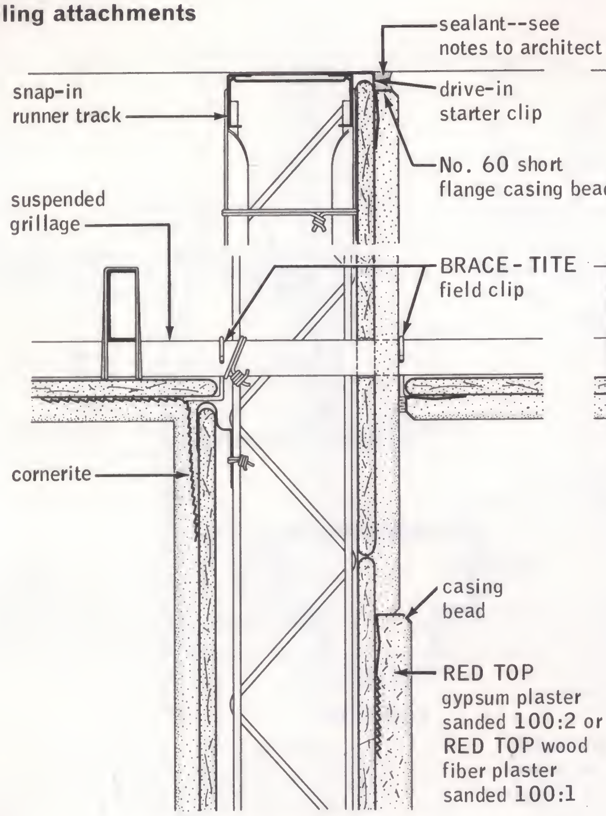
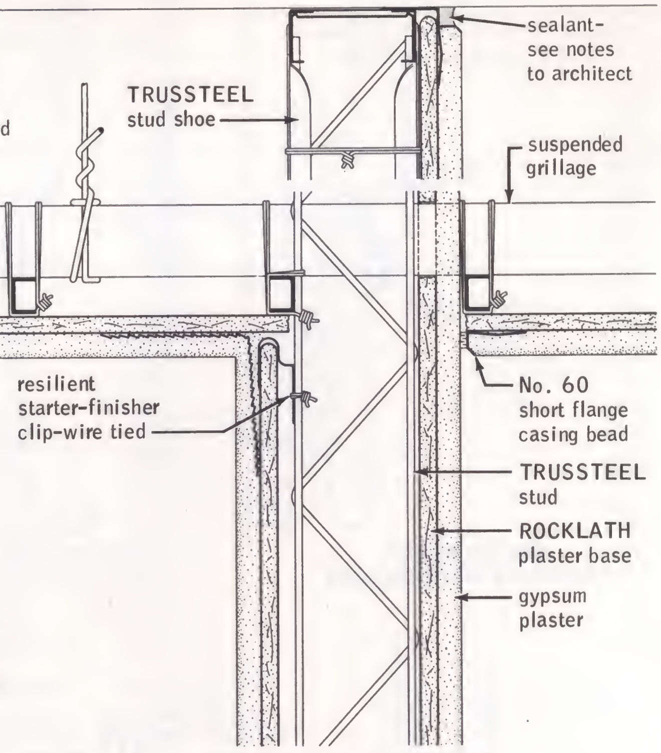
details/resilient attachment

scale: 3″=1′-0″

ceiling attachments

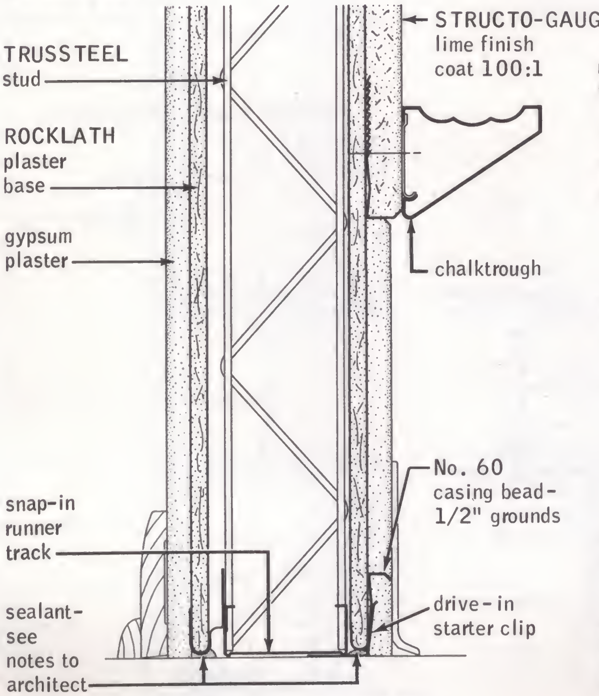

sealant--see notes to architect
snap-in runner track
drive-in starter clip
No. 60 short flange casing bead
suspended grillage
BRACE-TITE field clip
cornerite
casing bead
RED TOP gypsum plaster sanded 100:2 or RED TOP wood fiber plaster sanded 100:1

cross section transverse to furring channel


TRUSSTEEL stud shoe
sealant-see notes to architect
suspended grillage
resilient starter-finisher clip-wire tied
No. 60 short flange casing bead
TRUSSTEEL stud
ROCKLATH plaster base
gypsum plaster

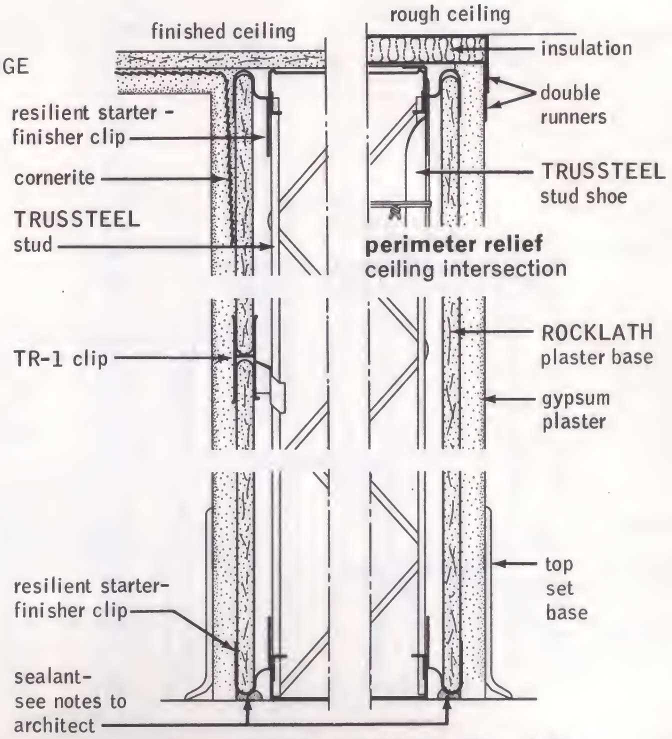
cross section parallel to furring channel

floor attachment



wood

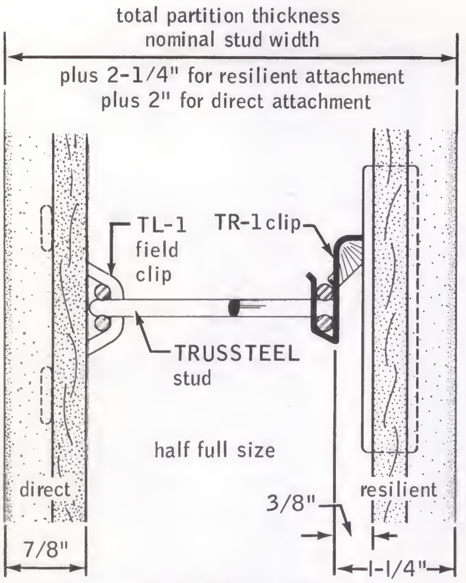
top set



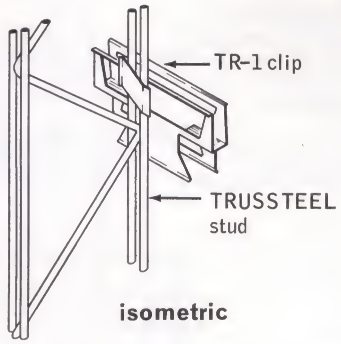
resilient TRUSSTEEL stud assemblies

details

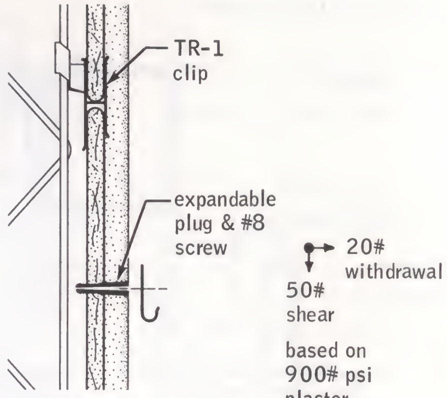
scale: 3" = 1'-0"



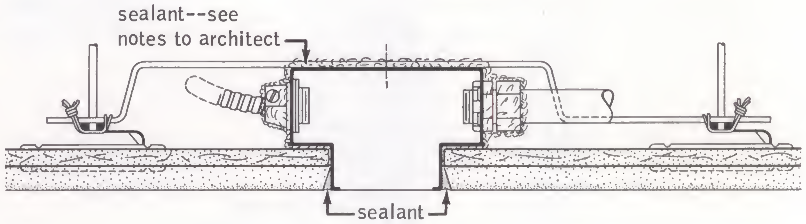
attachment of **ROCKLATH** plaster base



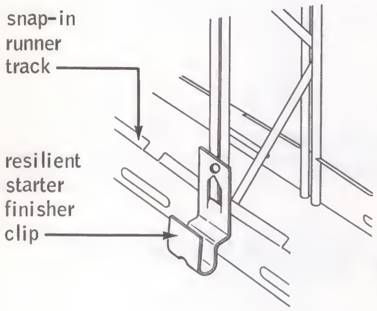
isometric



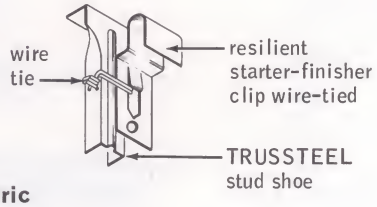
light fixture attachment

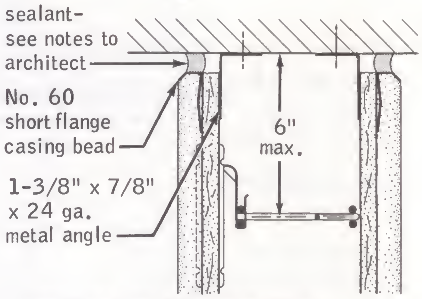


outlet box

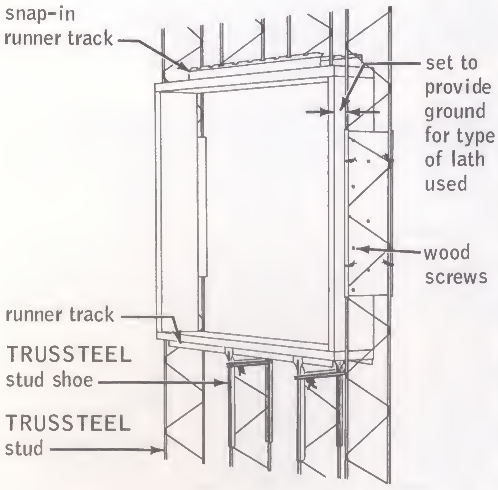


isometric

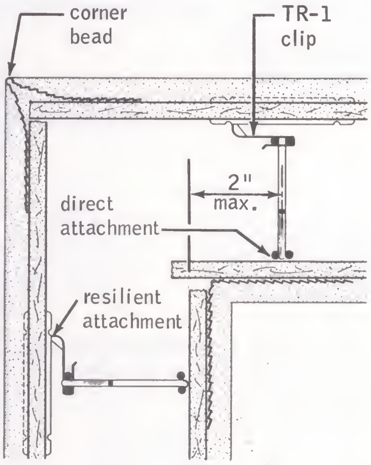



sealant- see notes to architect
No. 60 short flange casing bead
1-3/8" x 7/8" x 24 ga. metal angle
6" max.

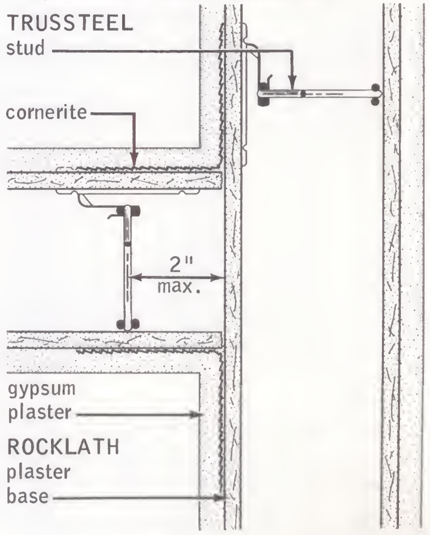
partition wall intersection



borrowed light or cabinet frame



corner

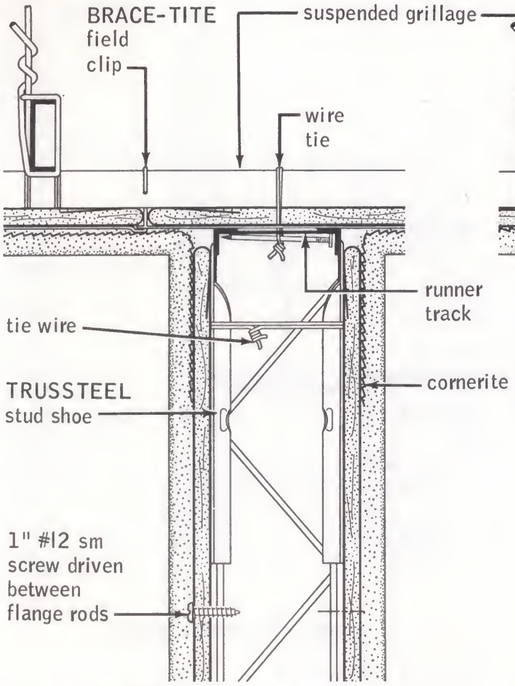


partition intersection

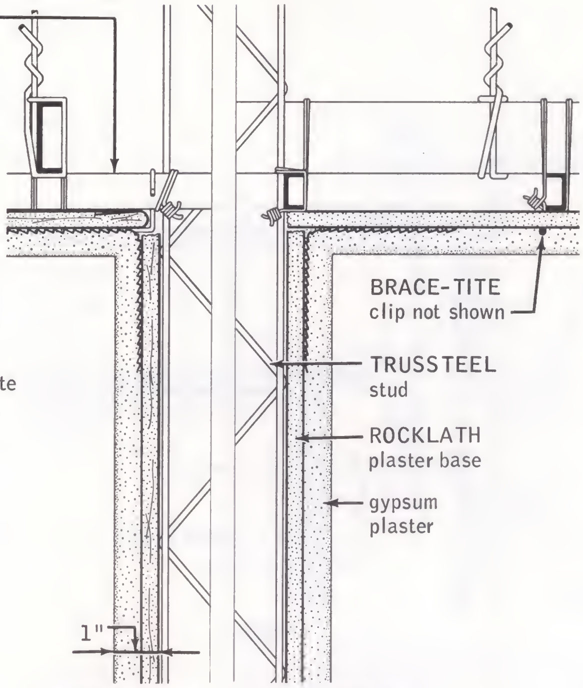
details/direct attachment

ceiling attachments

scale: 3" = 1'-0"

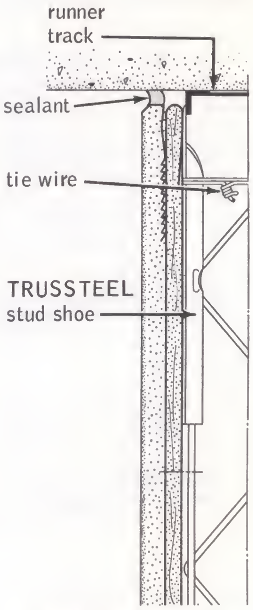


cross section transverse to furring channel



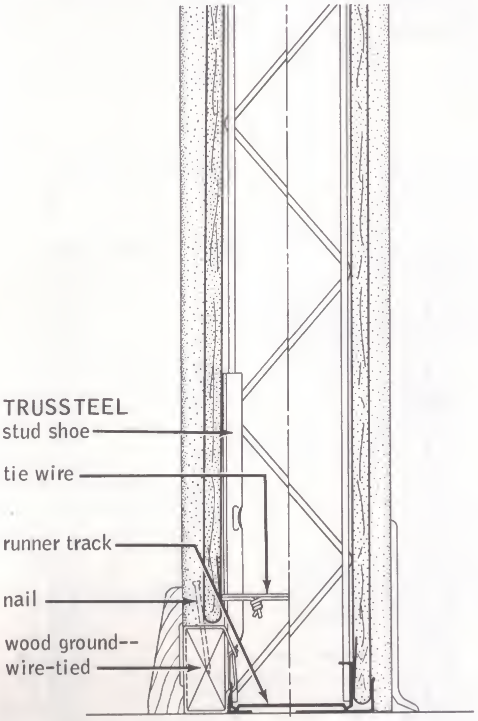
cross section transverse to furring channel

cross section parallel to furring channel

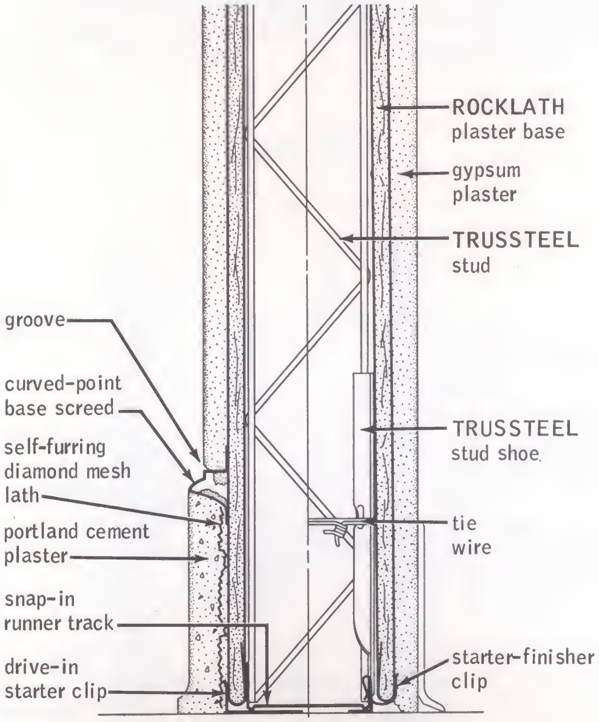


attachment to concrete ceiling slab

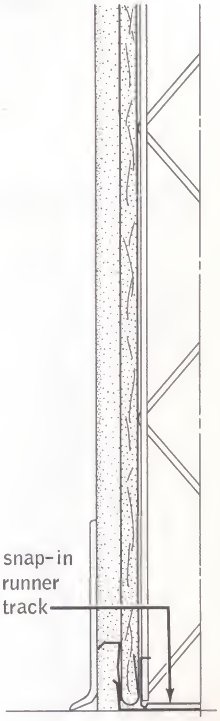
floor attachments



wood top set



cement top set

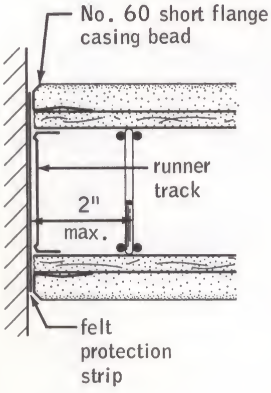


top set

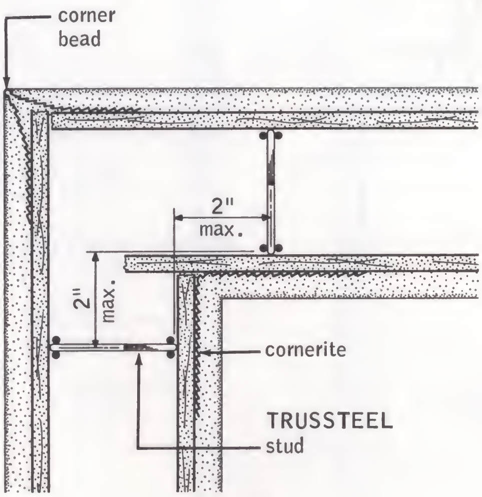
details/direct attachment

scale: 3" = 1'-0"

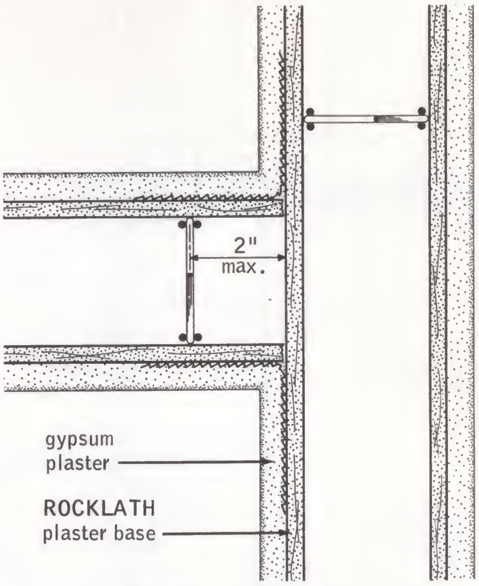
intersecting partitions



partition wall intersection

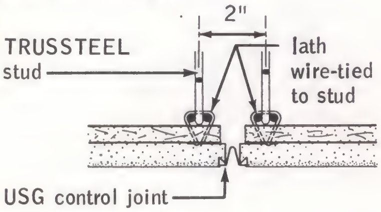


corner

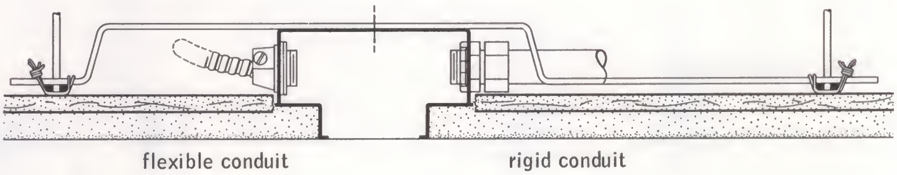


partition intersection

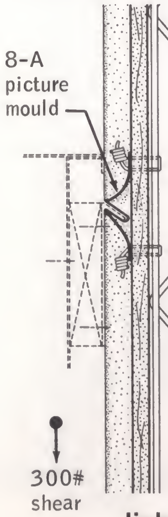
wall control joint



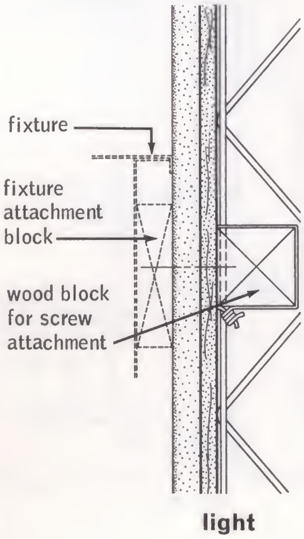
electrical outlet



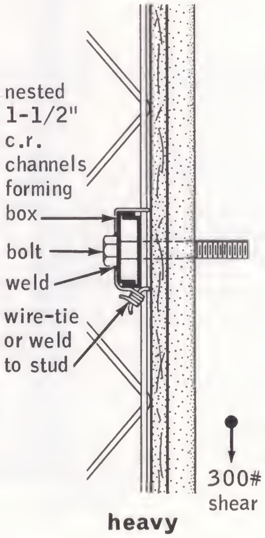
fixture attachments



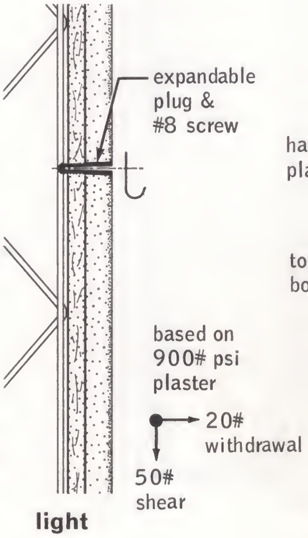
light



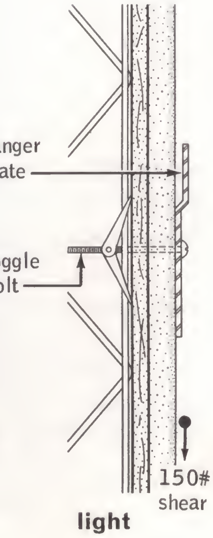
light



heavy



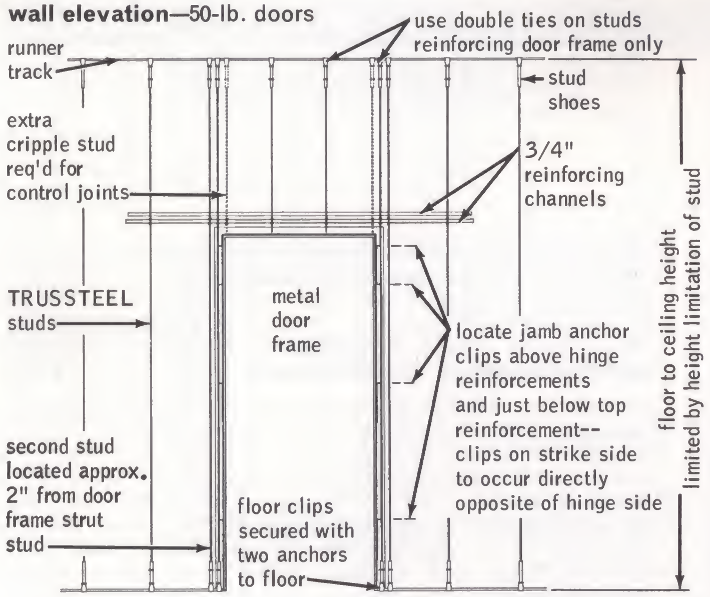
light



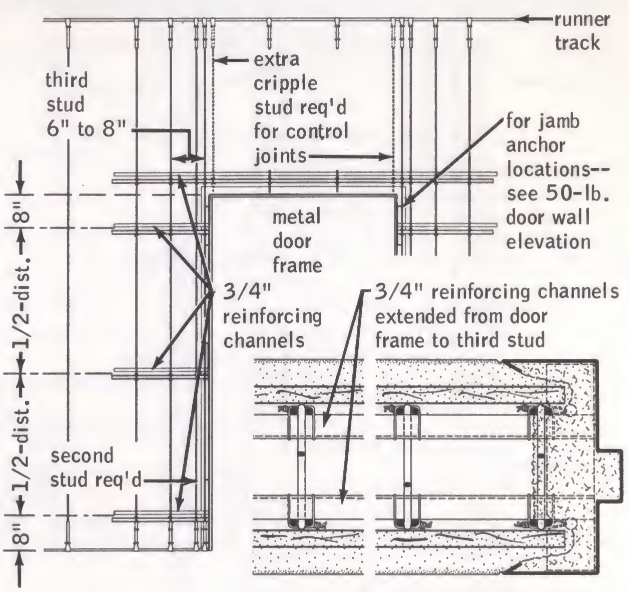
light

details/door frames

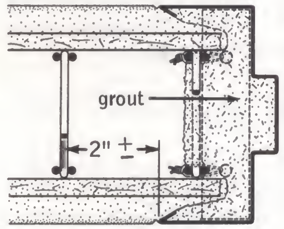
wall elevation—50-lb. doors


use double ties on studs reinforcing door frame only
runner track
stud shoes
extra cripple stud req'd for control joints
3/4" reinforcing channels
TRUSSTEEL studs
metal door frame
locate jamb anchor clips above hinge reinforcements and just below top reinforcement--clips on strike side to occur directly opposite of hinge side
floor to ceiling height limited by height limitation of stud
second stud located approx. 2" from door frame strut stud
floor clips secured with two anchors to floor

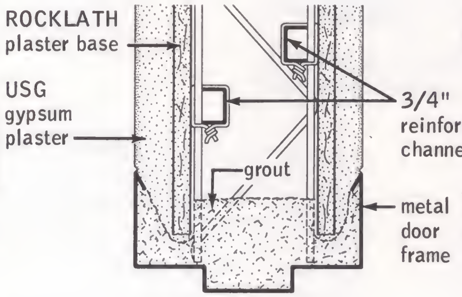
wall elevation—50 to 200-lb. doors


runner track
third stud 6" to 8"
extra cripple stud req'd for control joints
for jamb anchor locations--see 50-lb. door wall elevation
metal door frame
8"
1/2-dist.
1/2-dist.
8"
3/4" reinforcing channels
3/4" reinforcing channels extended from door frame to third stud
second stud req'd

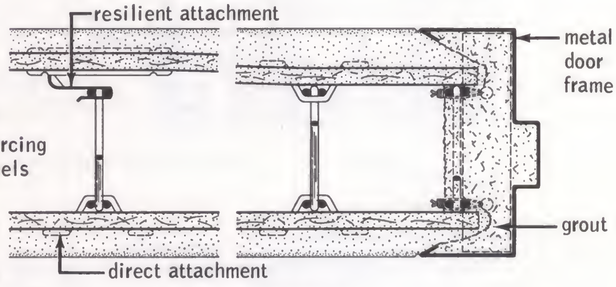
reinforced jamb



jamb section direct attachment

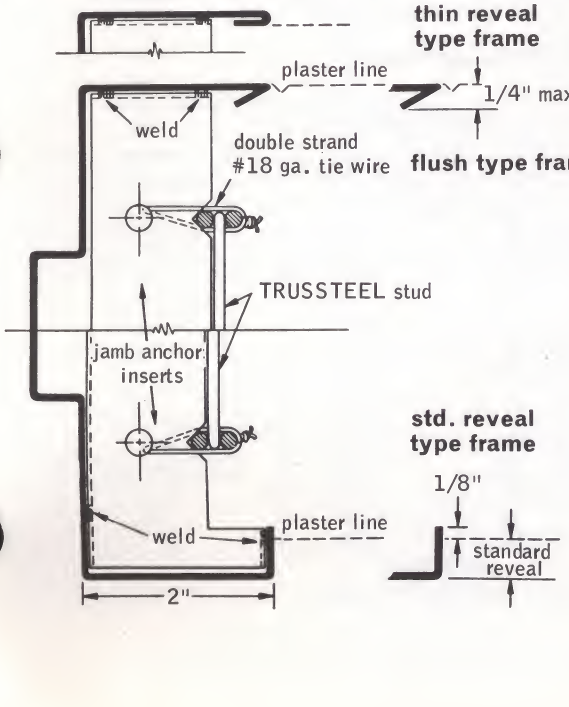


head section



jamb section

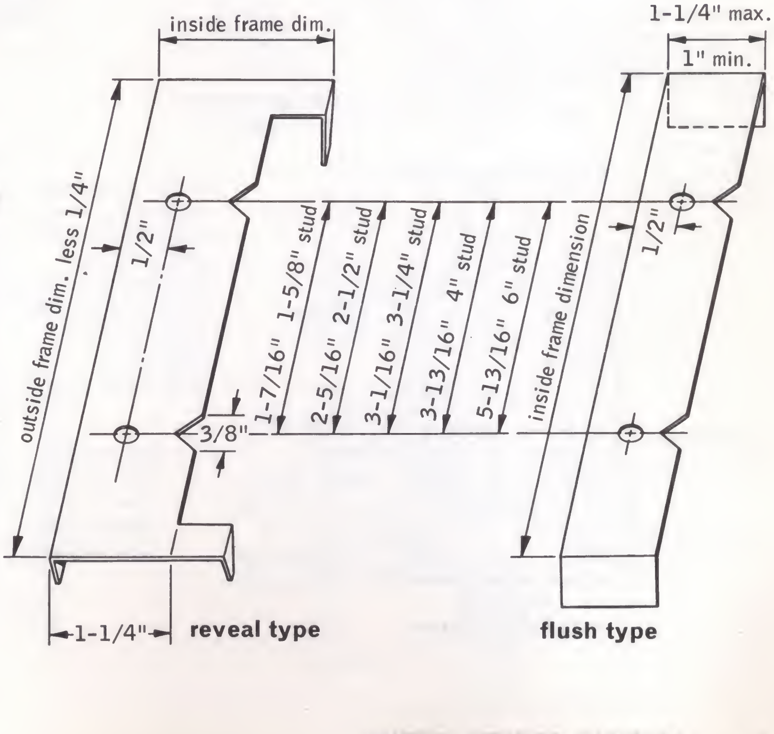
jamb anchor inserts/half size



thin reveal type frame

flush type frame

std. reveal type frame

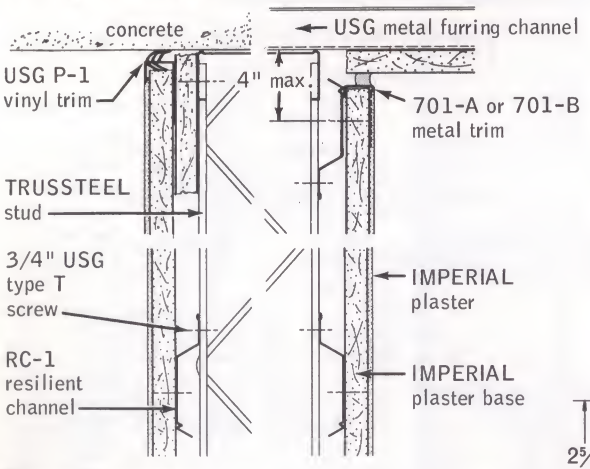


reveal type **flush type**

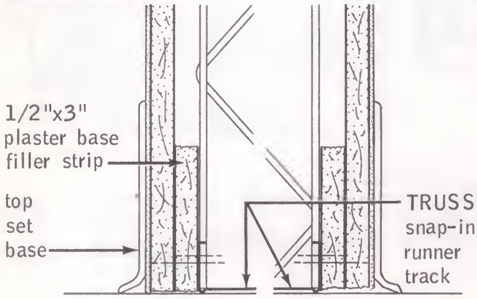
details

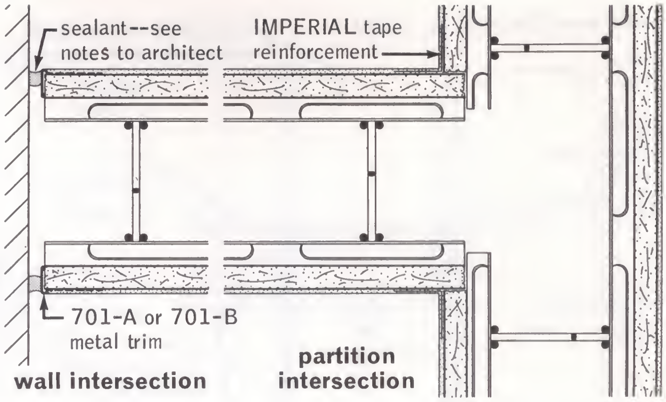
scale: 3" = 1'-0"

ceiling attachment



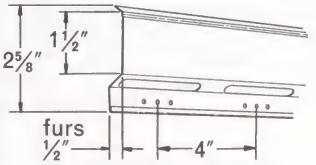
floor attachment


1/2"x3" plaster base filler strip
top set base
TRUSSTEEL snap-in runner track


sealant--see notes to architect
IMPERIAL tape reinforcement
701-A or 701-B metal trim

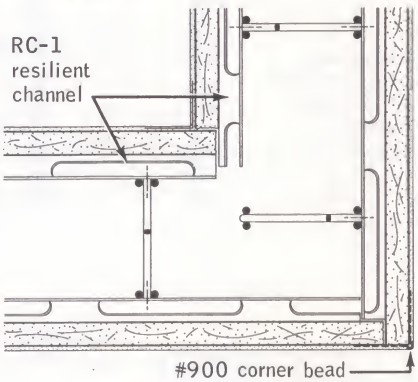
wall intersection

partition intersection

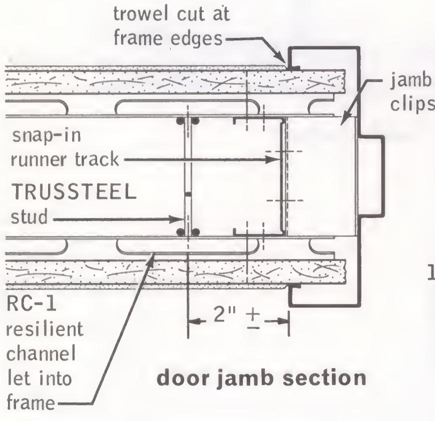


RC-1 SHEETROCK resilient channel

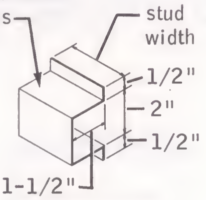
¾" USG type T pan head screw



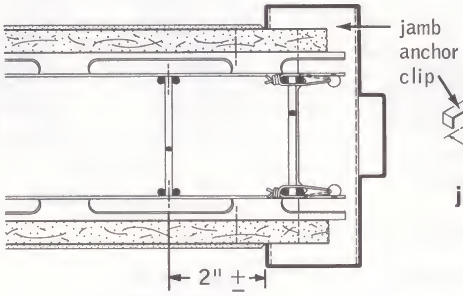
partition corner


trowel cut at frame edges
jamb anchor clips
snap-in runner track
TRUSSTEEL stud
RC-1 resilient channel let into frame
2" ±

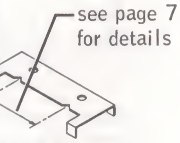
door jamb section



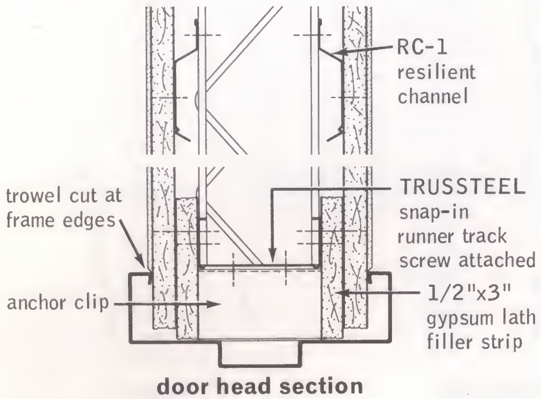
jamb anchor clip



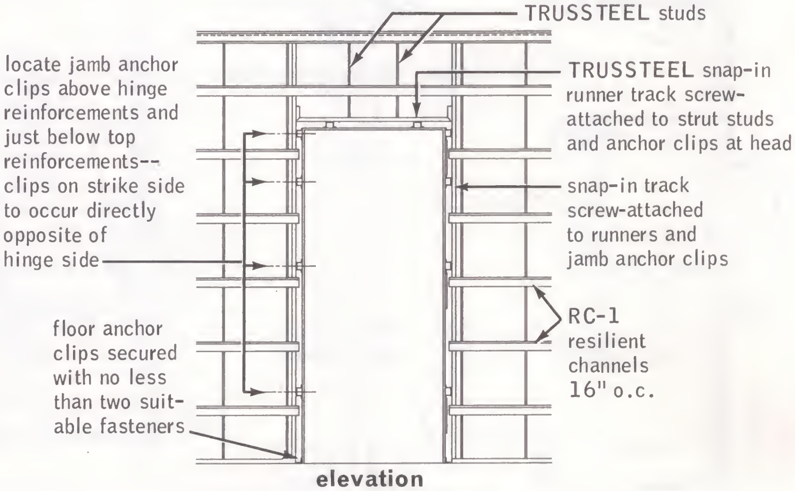
alt. door jamb section



jamb anchor clip


RC-1 resilient channel
trowel cut at frame edges
TRUSSTEEL snap-in runner track screw attached
anchor clip
1/2"x3" gypsum lath filler strip

door head section


TRUSSTEEL studs
locate jamb anchor clips above hinge reinforcements and just below top reinforcements--clips on strike side to occur directly opposite of hinge side
TRUSSTEEL snap-in runner track screw-attached to strut studs and anchor clips at head
snap-in track screw-attached to runners and jamb anchor clips
floor anchor clips secured with no less than two suitable fasteners
RC-1 resilient channels 16" o.c.

elevation
cross section thru frame

exterior wall furring

description	comments
TRUSSTEEL Studs 16″ o.c. cross braced 4′ o.c. on back chord, ⅜″ Foil-Back ROCKLATH attached with TL-1 Clips, ½″ sanded basecoat plaster, lime putty finish	Free standing; allows for pipe chase clearance; good vapor barrier
TRUSSTEEL Studs 24″ o.c.—RC-1 channels spaced 16″ o.c. attached with ¾″ Type T screws—Foil-Back IMPERIAL Plaster Base attached with 1″ Type S screws—1/16″ IMPERIAL plaster—joints taped	Free standing; allows pipe chase clearance; good vapor barrier

It is recommended that all exterior masonry walls be furred. Asphaltic or bituminous bonding agents are not recommended as a plaster base. TRUSSTEEL Studs, gypsum lath and plaster provide exterior wall furring systems that offer a maximum free space for encasement of pipes, ducts or conduits and a finished, readily decorated interior wall surface.

For standard plaster, the construction consists of TRUSSTEEL Studs as vertical members braced with horizontal ¾″ channels. A channel at the mid-point between the floor and ceiling is attached to the wall with USG Adjustable Wall Furring Brackets not more than 32″ o.c. horizontally. TRUSSTEEL Studs spaced 16″ o.c. are wire-tied to these horizontal channels. ⅜″ Foil-Back ROCKLATH, 16″ x 96″, is clipped to the TRUSSTEEL Studs and plastered to ½″ grounds. The Adjustable Wall Furring Brackets and extra channel at mid-height may be omitted to obtain free-standing furring.

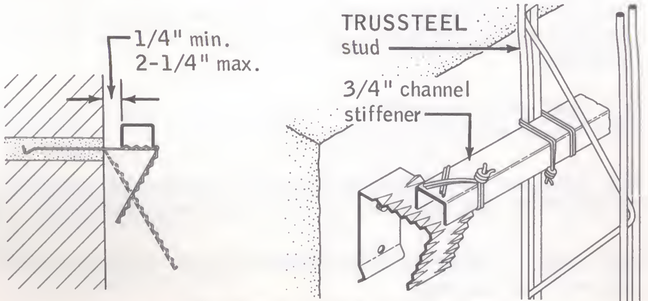
TRUSSTEEL stud size	maximum height[1]	
	braced furring	free-standing furring
1⅝″	9′	6′
2½″	15′	10′
3¼″	21′	14′
4″	22′	15′
6″	26′	17′

(1) Based on 16″ spacing between studs and L/360 deflection.

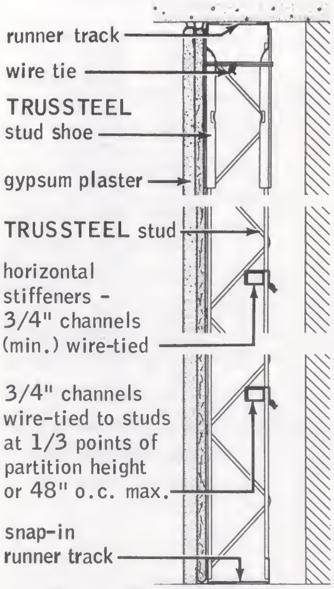
For veneer plaster, the construction consists of TRUSSTEEL Studs as vertical members, spaced 24″ o.c. and inserted top and bottom into TRUSSTEEL Snap-in Runner Track. RC-1 Channels, spaced 16″ o.c., are screw-attached to the TRUSSTEEL Studs on side to be faced. ½″ IMPERIAL Base is screw-attached to the RC-1 Channels, then plastered to 1/16″ to 3/32″ grounds.

TRUSSTEEL stud size	stud spacing	maximum height (1)
1⅝″	16″ 24″	9′-0″ 8′-0″
2½″	16″ 24″	10′-9″ 9′-6″
3¼″	16″ 24″	13′-0″ 11′-6″
4″	16″ 24″	15′-3″ 13′-3″
6″ (2)	16″ 24″	20′-9″ 18′-0″

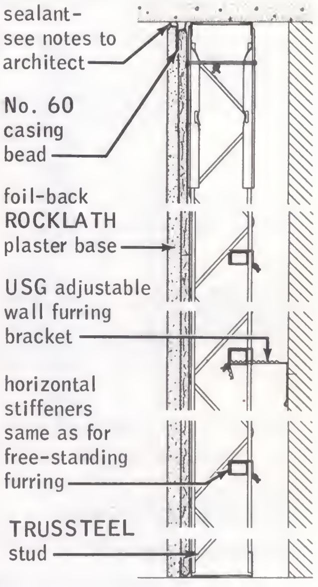
(1) Limiting deflection criteria = L/360 at 0 psf. (2) TRUSSTEEL runner track and shoes required.



adjustable wall furring bracket and attachment to TRUSSTEEL studs

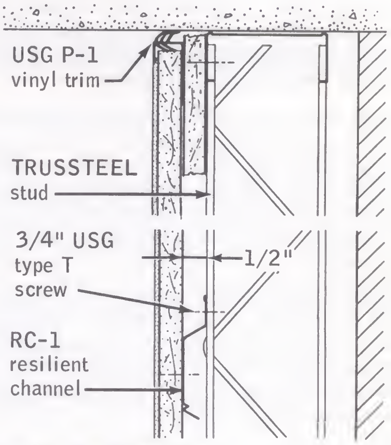

runner track
wire tie
TRUSSTEEL stud shoe
gypsum plaster
TRUSSTEEL stud
horizontal stiffeners - 3/4" channels (min.) wire-tied
3/4" channels wire-tied to studs at 1/3 points of partition height or 48" o.c. max.
snap-in runner track

free-standing furring

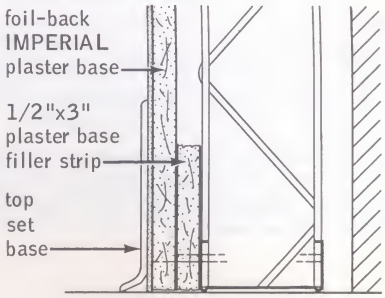

sealant- see notes to architect
No. 60 casing bead
foil-back ROCKLATH plaster base
USG adjustable wall furring bracket
horizontal stiffeners same as for free-standing furring
TRUSSTEEL stud

braced furring

ceiling attachment



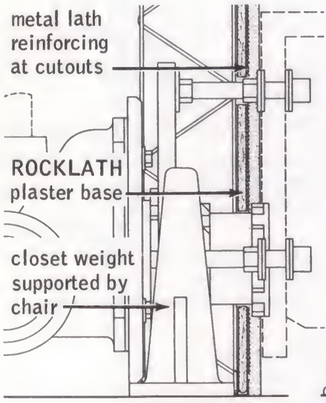
floor attachment


foil-back IMPERIAL plaster base
1/2"x3" plaster base filler strip
top set base

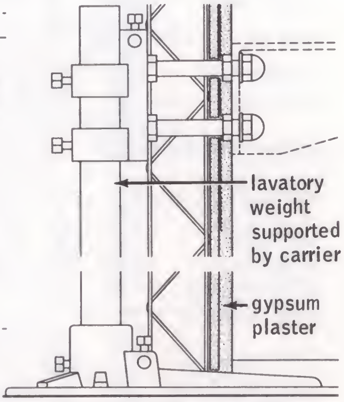
core walls/specifications

Core walls, as vertical shafts encasing the usual plumbing supply and waste lines, vent ducts and electrical conduits, require more free space than can be provided within the usual partition assembly.

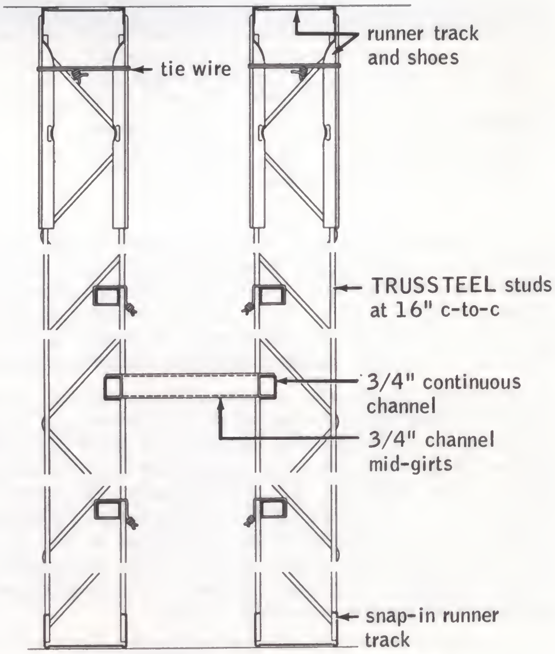
Core walls are easily constructed using Trussteel Studs and Rocklath, provided proper bracing is used to compensate for the stress skin action of the one side. The non-lathed side of the studs should be braced with ¾″ continuous channel girts at the quarter points vertically or 48″ o.c. maximum, and ¾″ channel bracket mid-girts spaced 36″ o.c. horizontally.


metal lath reinforcing at cutouts
ROCKLATH plaster base
closet weight supported by chair

closet carrier



lavatory carrier



TRUSSTEEL stud core wall framing

specifications

notes to architect

1. *16″ x 96″ ROCKLATH Plaster Base is preferred on standard plaster TRUSSTEEL Stud installations, and particularly over door frames or other openings.*

2. *Fire-rated partitions using standard plaster require that TRUSSTEEL Studs be attached to TRUSSTEEL or Snap-In Runner Track with TRUSSTEEL Stud Shoes at the ceiling.*

3. *TRUSSTEEL Snap-In Runner Track with studs cut accurately to lengths may be used for floor and ceiling attachment where the construction is non fire-rated. This track may be used at the floor on fire-rated partitions.*

4. *Metal door and borrowed-light frame material should be at least 16-ga. steel, shop primed, with throats accurately formed to overall thickness of partition. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Four jamb anchor inserts should be provided in each jamb, welded to the trim returns.*

Grouting and additional reinforcement at the jamb are recommended for all door frames and are required for heavy (over 50 lbs. with hardware) or oversize doors which also require use of door closers and bumpers. Grout should be raked out to allow insertion of lath and plaster into frame; lath and plaster must not terminate against trim.

5. *Lath and plaster surfaces should be isolated with control joints or other means where:* **(a)** *partition abuts a structural element (except floor) or dissimilar wall or ceiling;* **(b)** *construction changes within the plane of the partition;* **(c)** *partition run exceeds 30′. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.*

6. *Penetrations of the lath and plaster diaphragm, such as door frames and borrowed-light openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.*

7. *Where a plaster surface is flush with metal, metal bucks, metal windows, or metal base, the plaster should be grooved between the two materials.*

8. **Fixture Attachment**—*Lightweight fixtures and trim should be installed using plastic plugs or other expandable anchors for screw attachment. Heavy fixture attachment is not recommended on resilient lath and plaster surfaces.*

Wood inserts for fixture attachment on non-resilient surfaces must always be wire-tied to inside of stud chords to prevent breaking up stress skin of lath and plaster.

9. **Ceramic Tile**—*Where required, ceramic tile may be installed:* **(a)** *by changing plaster base from ROCKLATH to Metal Lath (see U.S.G. System Folder SA-914);* **(b)** *by adhesive application over level brown coat gypsum plaster in accordance with adhesive manufacturer's specifications. IMPERIAL Plaster Base is not recommended as a base for the adhesive application of ceramic, metal and plastic tile. SHEETROCK W/R Gypsum Panels are recommended for this use.*

10. *Where these partitions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the partition. Back-to-back penetrations of the diaphragm and flanking paths should be eliminated. Use sand aggregate only. Door and borrowed-light openings are not recommended in sound control partitions.*

11. *Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.*

12. *Resilient channel spacing may be increased to 24″ o.c. if ⅝″ IMPERIAL Base and two-coat plaster application are used.*

13. *Proper sealing of IMPERIAL Plaster surfaces before decorating is essential.*

14. *See U.S.G. product folders in this series: Gypsum Plasters Folder SA-918 for plaster specifications; Plaster Bases & Accessories Folder SA-917 for general lathing specifications; Paint Products Folder SA-933 for paint specifications.*

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather, all glazing shall be completed and the building heated to a minimum of 55°F. before plaster base installation. Ventilation should be provided to carry off excess moisture.

b. When low humidity, high temperatures and rapid drying conditions exist during plaster base and plaster application, DURABOND Joint Compound and PERF-A-TAPE Reinforcement shall be used on all veneer plaster base joints and internal corners and allowed to set and dry thoroughly before plaster application.

Part 2: products

2.1 materials

a. TRUSSTEEL Runner Track—widths 1⅝″, 2½″, 3¼″, 4″, or 6″ (see Note 2, page 10).

b. TRUSSTEEL Snap-In Runner Track—widths 1⅝″, 2½″, 3¼″, or 4″ (see Note 3, page 10).

c. TRUSSTEEL Studs—widths 1⅝″, 2½″, 3¼″, 4″, or 6″ (see Note 3, page 10).

d. TRUSSTEEL Stud Shoes.

e. R-SF Resilient Starter—Finisher Clip.

f. TRUS-LOK Drive-in Starter Clip.

g. TR-1 Resilient Field Clip.

h. TL-1 TRUS-LOK Field Clip.

i. BRIDJOINT B-1 Field Clip.

j. USG Corner Bead No. (1-A)(4-R)(10-A)(900).

k. USG Self-Furring Junior Diamond Mesh Metal Lath.

l. USG Cornerite (2″ x 2″) (3″ x 3″).

m. USG Striplath.

n. USG Casing Bead No. (4)(60)(66)(138).

o. USG Base Screed No. 6-A.

p. USG 8-A Picture Mould.

q. USG Adjustable Wall Furring Bracket.

r. USG Cold-Rolled Channels ¾″, 1½″, 2″.

s. 18-ga. tie wire.

t. ROCKLATH Plaster Base—(⅜″ x 16″ x 48″) (⅜″ x 16″ x 96″) (regular) (foil-back).

u. THERMAFIBER Sound Attenuation Blankets (1″) (1½″) (2″) x 24″ x 48″.

v. IMPERIAL Plaster Base (Regular) (FIRECODE "C")—½″ thick, 48″ wide, lengths as required.

w. RC-1 SHEETROCK Resilient Channel.

x. Fasteners—USG Brand ⅜″ Type S and Type S-12 Pan Head Screws; ¾″ Type T Pan Head Screws; 1″ and 1⅝″ Type S Bugle Head Screws.

y. IMPERIAL Tape—(Type P) (Type S) for joint reinforcement.

z. PERF-A-TAPE Reinforcement and DURABOND Joint Compound.

aa. USG Metal Trim No. (701-A)(701-B).

bb. USG P-1 Vinyl Trim.

cc. USG Control Joint.

dd. USG Acoustical Sealant.

Part 3: execution

3.1 stud system erection

Install TRUSSTEEL Studs of the size shown on the plans or as herein specified, spaced max. (16″) (24″) o.c. Accurately align all partitions according to the partition layouts.

Securely attach runner tracks:

1. **To concrete slabs**—Using concrete stub nails or power-driven anchors, spaced max. 24″ o.c.

2. **To ceiling grillage**—Wire-tie, using a double strand of 18-ga. tie wire, spaced max. 24″ o.c.

3. **To plaster or gypsum base**—Toggle bolt or wire-tie, spaced max. 24″ o.c.

Place studs, cut to nominal ceiling height, vertically into and resting upon floor runner track. Top of studs can be no more than ⅜″ from ceiling with Snap-In Track; no more than 3″ from ceiling with TRUSSTEEL Runner Track.

Secure studs to Snap-In Track by twisting until studs engage notches in both floor and ceiling tracks; to TRUSSTEEL Runner Track with TRUSSTEEL Stud Shoes, crimped or wire-tied with double-strand 18-ga. wire.

Secure studs immediately adjacent to door and borrowed light frames with two wire ties of double-strand 18-ga. wire.

3.2 installation for veneer plaster

3.2.1 door frames

Install vertical strut studs, consisting of cut-to-length TRUSSTEEL Snap-In Runner Track, adjacent to TRUSSTEEL Studs at each side of each door opening. Anchor strut studs to floor and ceiling runners with ⅜″ type S screws at each flange intersection. Install headers formed from Snap-In Track, miter-cut and bent 90° at each end to abut against strut studs. Anchor headers to strut studs with two ⅜″ type S screws at each end. Anchor door frames with ⅜″ type S-12 screws driven through header and strut studs into frame anchor clips. For heavy oversize doors, install horizontal reinforcing channels in pairs at each side of door jamb and positioned 8″ from head and floor and at mid-height. Securely tie these aligning channels to inside of stud chord at each intersection.

3.2.2 resilient channel erection

Screw-attach ½″ thick x 3″ wide continuous filler strip of IMPERIAL Plaster Base to both sides of Snap-In Runner Track at the floor (also at the ceiling for fire-rated construction). Attach strip with 1″ type S screws 24″ o.c. Position RC-1 Resilient Channels 16″ o.c. vertically and secure to TRUSSTEEL Studs by driving a ¾″ type T pan head screw through the RC-1 attachment flange into the space between the two wires forming the chord of the stud. If the RC-1 attachment flange falls over protruding lugs on the stud, place the RC-1 with resilient flange in opposite direction.

3.2.3 plaster base application

Apply IMPERIAL Plaster Base of maximum practical length, with the long dimension at right angles to the channels and with end joints centered over the channel, staggered and neatly fitted. Fasten plaster base to channels with 1″ type S screws spaced 12″ o.c. in the field of the base and along abutting edges. Use 1⅝″ type S screws at floor and ceiling where plaster base is supported by filler strips. Drive screws at least ⅜″ from ends or edges of base. Be certain base is properly supported around all cut-outs and openings.

3.2.4 accessory application

When low humidity, high temperatures and rapid drying conditions exist, use DURABOND Joint System on all joints and internal corners and allow to set and dry thoroughly before applying finish plaster.

a. Reinforcing Tape—Apply over full length of all plaster base joints; do not overlap at intersection.

Type P Tape—Press firmly along entire length to insure firm wrinkle-free attachment.

Type S Tape—Apply with spring-driven stapler using ⅜″ staples. Use two staples at each end of tape and stagger intermediate staples 24″ o.c. along length of tape. At wall-ceiling intersections and interior corners, staple tape 24″ o.c. along ceiling edge or on one edge only. For fire-rated assemblies, staple tape 8″ o.c.

b. Corner Bead—Attach to all vertical and horizontal exterior corners with nails or 9/16″ rosin-coated staples spaced 12″ o.c. along both flanges.

c. Casing Bead—Install 701-A Metal Trim, expanded-mesh flange out, over plaster base at door and window openings; attach with nails driven into door or window buck. Install 701-B Metal Trim, expanded-mesh flange out, over plaster base at junction with rough concrete or masonry; attach with 9/16″ rosin-coated staples or with nails driven into framing.

d. Screws—Power-drive and set so screwhead is flush with surface of plaster base without tearing through face paper.

e. Vinyl Trim—Slip P-1 Trim over plaster base with long flange behind base. Install plaster base with trim firmly abutting surface.

f. Control Joint—Provide in the face layer as indicated and fasten with 9/16″ rosin-coated staples not over 12″ o.c. on both flanges along entire joint length. Be certain that resilient channel is interrupted at junction of control joint installation.

3.3 installation for standard plaster

3.3.1 door frames

Insert studs into steel door frame engaging notches of jamb anchor clips, and securely wire tie each chord of stud to each jamb anchor. Install second stud each side of door frame, approximately 2″ from strut stud.

Install two ¾″ cold-rolled channels over head of door, extending out to engage third stud on each side. For heavy oversize doors, install additional horizontal reinforcing channels in pairs each side of door jamb and position 8″ from head and floor and at mid-height. Securely tie these aligning channels to inside of stud chord at each intersection.

3.3.2 direct plaster base attachment

Apply ROCKLATH Plaster Base starting at bottom with long dimension at right angles to studs. Butt lath together and clip in place using (TRUS-LOK Starter Clips TL-2) (Drive-in Clips) and TRUS-LOK Field Clips TL-1, spaced not to exceed 16″ o.c. Fasten finishing course of ROCKLATH with 1″ #12 flat head self-tapping sheet metal screws driven between vertical stud wires and spaced 8″ from ceiling. Stagger end joints of lath between studs and align using BRIDJOINT B-1 Field Clips at all lath corners. Cut lath accurately and fit neatly around all electrical outlets, openings, etc.

3.3.3 resilient plaster base attachment

Apply ROCKLATH Plaster Base starting at bottom with long dimension at right angles to studs. Butt lath together and resiliently clip in place using Resilient Starter-Finisher Clip R-SF and Resilient Field Clip TR-1, spaced max. 16″ o.c. Stagger end joints of lath between studs and align using BRIDJOINT B-1 Field Clips at all lath corners. Cut lath accurately and fit neatly around all electrical outlets, openings, etc.

3.3.4 wall furring erection

On partitions designated as vertical furring, bridge back chord of TRUSSTEEL Stud using continuous ¾″ channels at third points or not to exceed 48″ o.c. and at mid-height. Saddle-tie channels to each stud.

On braced furring, securely attach mid-point bridging channel to masonry back-up with USG Adjustable Wall Furring Brackets 32″ o.c.

Install USG Adjustable Wall Furring Brackets with crimped edges up, using (one 2″ cut nail in mortar joints of brick, clay tile, or concrete block or in field of lightweight aggregate blocks) (⅝″ concrete stub nails or power-driven nails or other suitable fasteners in monolithic concrete) driven through top hole of bracket. Apply brackets to masonry walls at mid-height of furred wall and spaced not over 4″ from columns or other abutting construction and not over 32″ o.c. horizontally and 48″ o.c. vertically, and as required above and below windows. Lay mid-height furring channel horizontally on furring brackets with legs down, and wire-tie to bracket with double-strand 18-ga. tie wire. Bend excess bracket length down.

3.3.5 accessory application

a. Cornerite—Install in all interior plaster angles. Staple at the edges.

b. Metal Corner Bead—Provide on all external plaster corners in single lengths whenever possible. Fasten securely with galvanized staples, spaced max. 8″ o.c.; stagger in two wings.

c. Casing Bead—Install where indicated to provide full plaster grounds. Cut and miter ends accurately. Staple in place.

d. Reinforcing—Install a strip of self-furring diamond mesh lath over joints between dissimilar plaster bases. At all openings, reinforce corners by attaching a 6″ x 12″ piece of self-furring diamond mesh lath across corners. Staple in place.

e. Base Screed—Install 6″ above finish floor unless otherwise indicated. Set screeds level, true to line, in lengths as long as practical, with joints aligned with a suitable splice. Staple in place.

f. Control Joint—Provide as detailed and where indicated. Staple in place.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, TRUSSTEEL, ROCKLATH, IMPERIAL, BRIDJOINT, TRUS-LOK, THERMAFIBER, SHEETROCK, DURABOND, PERF-A-TAPE, STRUCTO-GAUGE, RED TOP, BRACE-TITE, FIRECODE.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606
SA-915/USG/1-75

description and utility

United States Gypsum produces the industry's broadest and best-known line of plasters, bases, metal structural members and lathing accessories. From these have been engineered dozens of partition, ceiling and wall furring assemblies, each of which provides different characteristics of structural stability, fire resistance and sound transmission loss. Performance and specification of these assemblies are covered in individual U.S.G. System Folders, which are keyed in turn to the U.S.G. Construction Selector index.

Basic information on the plastering components available for such assemblies is included here. Proper use of U.S.G. plaster bases and plasters provides the secure bond necessary to develop strength and resistance to abuse and cracking. A "mechanical" bond is formed when plaster is pressed through the mesh of metal lath, forming keys on the back side. A "suction" bond is formed when gypsum plaster is applied over gypsum lath and masonry bases; the tiny needle-like plaster crystals penetrate into the surface pores of the base by suction.

Bases and accessories are covered in this catalog in five groups: (1) Gypsum Plaster Bases; (2) Metal Lath; (3) Corner Beads, Trim, Control Joints; (4) Lath Attachment Clips and Screws; (5) Structural Accessories.

Plastering products are covered in four classifications, starting on page 7: (6) Veneer Plasters; (7) Basecoat Plasters; (8) Finish and Gauging Plasters and Finishing Limes; (9) Special Plasters.

Descriptions, uses, properties and limitations are shown for each product. General lathing and plastering specifications appear on pages 10 to 12.

For the beauty and durability of which plaster is capable, rigid requirements should be followed as to number of coats applied. Three-coat work is mandatory on all metal lath, and on edge-supported gypsum lath used in ceilings; three-coat work is desirable on all gypsum lath; two-coat work is acceptable on gypsum lath when properly supported, and masonry plaster bases. Exceptions are noted below for Imperial Veneer Plasters.

In the preparation of plastering specifications, consideration should be given to the selection of materials not only for compatability, but for the *quality* of the structure to be plastered. Since ANSI and AIA specifications are based on minimum standards, they should be followed only in applications where minimum plastering quality is desired. It is wise to upgrade plastering specifications wherever possible.

Plastering Performance Selector—Following are general recommendations listed in the order of preference—No. 1 in each case being expected to produce the highest quality results:

Basecoat Plaster (over metal lath)

Scratch Coat	Brown Coat
1. Structo-Base(1) Plaster, sanded 100:2	Structo-Base Plaster, sanded 100:3
2. Wood Fiber, neat, or sanded up to 100:1	Wood Fiber Plaster, sanded up to 100:1
3. Wood Fiber, neat, or sanded up to 100:1	Red Top Gypsum Plaster, sanded 100:2
4. Red Top Gypsum Plaster, sanded 100:2	Red Top Gypsum Plaster, sanded 100:3
5. Wood Fiber, neat, or sanded up to 100:1	Structo-Lite Plaster (sand float finish only)
6. Wood Fiber, neat, or sanded 100:1	Red Top Gypsum Plaster, perlited 100:2 (sand float finish only)

(1) Verify availability with your local U.S.G. sales representative.

Basecoat Plaster (over gypsum lath)

See "Use of Aggregates" table, page 8.

Aggregates

1. Sand
2. Mill-mixed Perlite
3. Job-mixed Perlite
4. Job-mixed Vermiculite

Note: Lightweight aggregates should not be used on a construction where sound isolation is a consideration.

Veneer Plasters (over veneer base)

1. Imperial Basecoat and Finish Plaster (two-coat system)
2. Imperial Basecoat and other appropriate finish (two-coat system)
3. Imperial Finish Plaster (one-coat system)
4. Diamond Interior Finish (one-coat system)

Finish Coats

Float Finishes

1. Ivory or Snowdrift Lime (92% hydrate), Keenes Cement and white silica sand
2. Grand Prize or Red Top Lime, Red Top Gauging and white silica sand

Smooth Trowel Finishes

1. Ivory or Snowdrift Lime and Structo-Gauge Plaster
2. Ivory or Snowdrift Lime, Red Top Gauging, with ½ cu. ft. of perlite fines or fine silica sand
3. Ivory or Snowdrift Lime and Keenes Cement
4. Grand Prize or Red Top Lime, and Red Top Gauging Plaster

Note: Float Finish 1 and Trowel Finish 2 (except over metal lath) are the only finishes recommended for use over a basecoat containing lightweight aggregate. Smooth Trowel Finishes 1 and 3 provide high abrasion resistance and because of their hardness must be used over a comparably hard basecoat.

types and functions

1. Gypsum Plaster Bases

description

Rocklath, Imperial and USG R.H. plaster bases are gypsum lath in sheet form providing a rigid base for the economical application of gypsum plasters. A special gypsum core is faced with multi-layered laminated paper designed to check plaster slide, control absorption and resist lath sag.

These gypsum bases are fabricated in thicknesses of ⅜″, ½″ and ⅝″, and in seven different products for specific uses as listed below. All Rocklath Bases comply with ASTM C37 and Federal Specification SS-L-30D, Type I. Imperial Bases comply with ASTM C588 and Federal Specification SS-L-30D, Type VI.

Thermal coefficient of expansion (unrestrained): 9.0×10^{-6} in. per in. per deg. F. (40°—100° F); hygrometric coefficient of expansion (unrestrained): 5.4×10^{-6} in. per in. per % r.h. (5% —90% r.h.)

limitations

1. Maximum frame and fastener spacing is dependent on thickness and type of lath used. Refer to appropriate system folder for details.
2. Should be used with gypsum plaster only; except Imperial Gypsum Base may be used for one-coat application of Diamond Interior Finish. Bond between lime putty finishes or portland cement plaster and Rocklath Base is inadequate.
3. Gypsum lath and plaster, painted, has a vapor permeability of about 3¾ perms. For higher resistance to vapor transmission, Foil-Back Rocklath Plaster Base and Imperial Gypsum Base should be used.
4. Should not be used in areas exposed to excessive moisture for extended periods. USG galvanized metal lath and portland cement-lime plaster are recommended.

Imperial Gypsum Base is a special gypsum lath in large sheet form, designed for use with Imperial Plasters. Available in Regular, Firecode and Firecode "C" core and Foil-Back 48″ wide, ½″ or ⅝″ thick, 8 to 14-ft. lengths. Firecode and Firecode "C" types have fire-rated cores which add fire protection and are listed by UL under Label Service. The 1⁄16″ to 3⁄32″ plaster thickness is applied after joints have been treated with Imperial glass fiber open-weave tape. USG No. 900 corner bead is used.

Regular Rocklath Plaster Base is recommended for nail or staple application to wood and nailable steel framing, for clip attachment to wood framing, steel studs and suspended metal grillage, and for screw attachment to USG steel studs and furring channels. **Sizes:** 16″ x 48″, ⅜″ or ½″ thick; 16″ x 96″, ⅜″ thick (also made 16⅕″ wide for Pacific Coast area).

Rocklath Firecode Plaster Base is a gypsum lath which combines all the advantages of Regular Rocklath with additional resistance to fire exposure—the result of a specially formulated core containing special mineral materials. **Size:** nom. 16″ x 48″, ⅜″ thick.

Foil-Back Rocklath Plaster Base is made in the same sizes as Regular Rocklath, but has bright aluminum foil laminated to the back side. This creates an effective vapor barrier at no additional labor cost. Its vapor permeability of 0.67 perms is well below the 1.00 perm limit permissible under HUD requirements. In addition, Foil-Back Rocklath provides positive insulation value when installed with the foil facing a ¾″ minimum air space. When used as a ceiling, under winter heating conditions its resistance value is 2.69; in retarding downward heat flow in summer, its effectiveness is nearly doubled to a resistance value of 4.88 including air space (see table below). Corrosion and normal dust accumulation exert negligible effect on the vapor barrier and insulation characteristics of Foil-Back Rocklath.

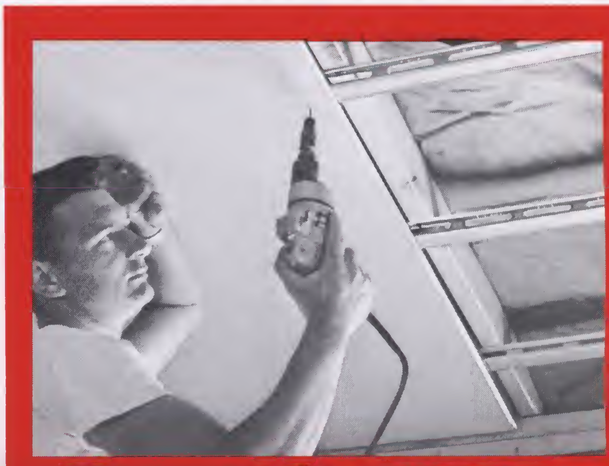
ROCKLATH Plaster Bases

USG R.H. Base is a specially fortified large-size gypsum lath, used with Red Top Radiant Heat Plasters in electric cable ceilings. Available 48″ wide, regular ½″ or ⅝″ thick, Firecode ½″ thick, 8 to 14-ft. lengths. Nailed or screw-applied to wood joists; screw-applied to USG metal furring channels or RC-1 resilient channels; joints reinforced with 2½″ wide Imperial glass fiber tape. System (see U.S.G. Bulletin P-480) improves heat emission and resistance to heat deterioration. Meets NEC requirements. UL listed.

Thermal Resistance Values—Foil-Back ROCKLATH

Surface, Heat Flow & Season			Foil-Back ROCKLATH	
			⅜″	½″
horizontal	(up)	winter	2.69	2.82
horizontal	(dn)	summer	4.88	5.01
vertical	(hor)	winter	3.89	4.02
vertical	(hor)	summer	3.89	4.02

Note: Resistances are based on still air film, ½″ sanded plaster, and lath with one reflective surface facing a ¾″ min. still air space.


IMPERIAL Gypsum Base applied over RC-1 Resilient Channels offers excellent sound control

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2. USG Metal Lath

description

USG Metal Lath is sheet steel that has been slit and expanded to form a multitude of small mesh openings. It is made in Diamond Mesh, Riblath and Stuccomesh types and in two different weights for each style. They are manufactured from galvanized or rust-resisting copper alloy steel, further protected by a coating of black asphaltum paint. Comply with Federal Specification QQ-L-101C.

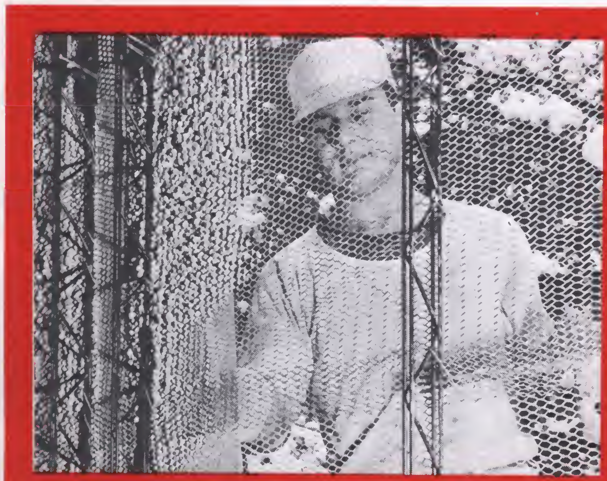
USG Junior Diamond Mesh Lath is a small diamond mesh metal plaster base (approx. 11,000 meshes per sq. yd.). A general all-purpose lath, best for ornamental, contour plastering. The small meshes conserve plaster and reduce droppings. Available painted and galvanized.

Also available in self-furring type having ¼" "dimple" indentations spaced 1½" o.c. each way for use as exterior stucco base, column fireproofing and for replastering over old surfaces. **Size:** 27" x 96". **Weights:** 2.5 lb. (end painted white) and 3.4 lb. (end painted red) per sq. yd.

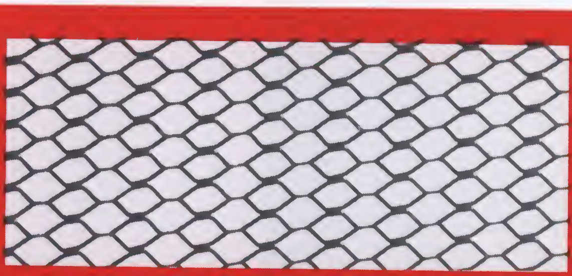
USG Poly-Backed Metal Lath is painted or galvanized Junior Diamond Mesh Lath with 1-mil clear polyethylene factory-bonded to the back. Ideal for machine-applied stucco in curtain walls and for plaster in interior partitions. **Size:** 27" x 96". **Weight:** 2.5 lb. and 3.4 lb. per sq. yd.

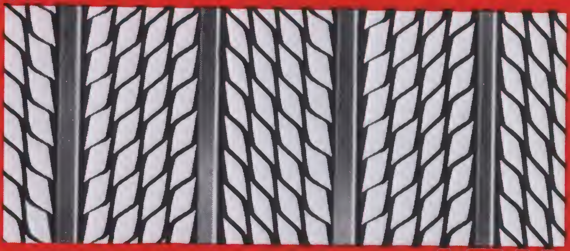
USG 4-Mesh Z-Riblath is a "flat rib" type of lath with smaller mesh openings, suitable for "double-up" type of plastering. An excellent nail-on lath, or for tie-on work on flat ceilings. **Size:** 27" x 96". **Weights:** 2.75 lb. (end painted white) and 3.4 lb. (end painted red) per sq. yd. **Limitation:** not for contour or resilient work; Diamond Mesh preferred.

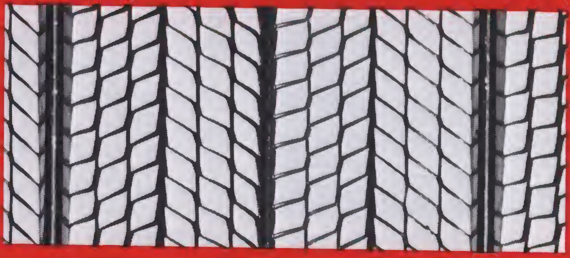
USG ⅜" Riblath comes in a herringbone mesh pattern with ⅜" V-shaped ribs running lengthwise of the sheet at 4½" intervals, with inverted intermediate 3/16" ribs. The heavy ribs provide exceptional rigidity. Used when supports are spaced more than 16" o.c. and for 2" solid studless metal lath and plaster partitions. Also used as a centering lath for concrete floor and roof slabs. Available painted and galvanized. **Size:** 27" x 96" (other lengths available). **Weight:** 3.4 lb. (end painted red) per sq. yd. **Limitation:** its extreme rigidity makes ⅜" Riblath unsuitable for contour plastering or resilient application—use Diamond Mesh Lath; due to ⅜" rib, minimum ground thickness must be 1".

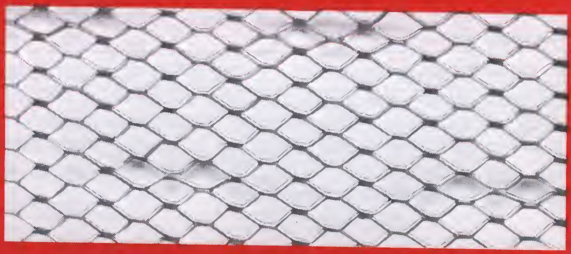

Plaster keys to metal lath for high resistance to cracking.

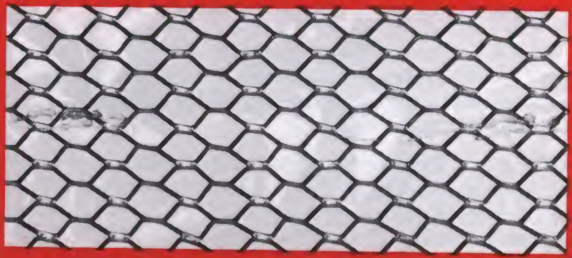
USG Expanded Metal Stuccomesh is a 1⅜" x 3⅛" diamond mesh pattern designed as a base for exterior stucco, hand or pump applied. **Size:** 48" x 99". **Weight:** 3.6 lb. per sq. yd. **Limitations:** should be applied with 1½" galvanized self-furring nails; when used over sheathing other than wood, fasten with longer nails providing minimum penetration of 1⅛" into studs.

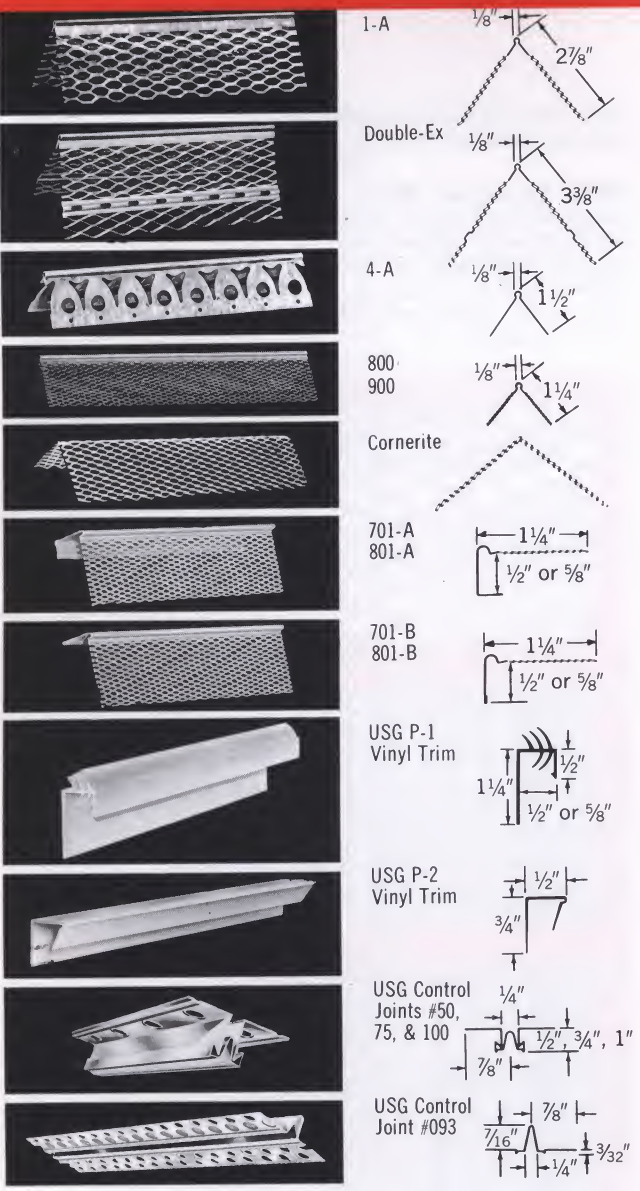

USG Junior Diamond Mesh Lath


USG 4-Mesh Z-Riblath


USG ⅜" Riblath


USG Self-Furring Diamond Mesh Lath


USG Poly-Backed Metal Lath



3. USG Corner Beads, Trim, Control Joints

description

USG Corner Beads and Trim, made from top-quality galvanized steel, enjoy the industry's top acceptance because of their dependability and continual improvement in design. Corner beads (26-ga.) are available in 8 and 10-ft. lengths, metal trim (30-ga.) in 7 and 10-ft. lengths, casing beads (24-ga.) in 7, 8 and 10-ft. lengths.

1-A Expanded Corner Bead has wide expanded flanges that are easily flexed. Preferred for irregular corners. Provides increased reinforcement close to nose of bead.

Double-Ex Corner Bead has full 3¼″ flanges easily adjusted for plaster depth on columns. Ideal for finishing corners of structural tile and rough masonry. Has perforated stiffening ribs along expanded flange.

4-A Flexible Corner Bead is an economical general purpose bead. By snipping flanges, this bead may be bent to any curved design (for archways, telephone niches, etc.). Can be secured to corners with **9-A Corner Bead Clips** attached to flanges.

800 Corner Bead gives 1/16″ grounds needed for one-coat veneer finishes. Approx. 90 keys per lin. in. provide superior bonding and strong, secure corners. The 1¼″ fine-mesh flange eliminates shadowing, is easily nailed or stapled.

900 Corner Bead is used with two-coat IMPERIAL Plaster systems, gives 3/32″ grounds. Its 1¼″ fine-mesh flange can be either stapled or nailed. Provides superior plaster key and eliminates shadowing.

Cornerite and Striplath are strips of painted copper alloy Diamond Mesh Lath used as reinforcement. Selv-edge **Cornerite** is bent lengthwise in the center to form a 100° angle. It should be used in all interior angles where metal lath is not lapped or carried around, over non-ferrous lath anchored to the lath, and over internal angles of masonry constructions to reduce plaster cracking. Also available galvanized. **Sizes:** 2″x2″x96″ and 3″x3″x96″. **Striplath** is a similar flat strip, used as a plaster reinforcement over joints of non-metallic lathing bases and where dissimilar bases join; also to span pipe chases. **Size:** 4″x96″.

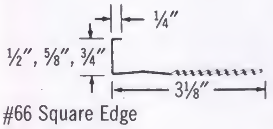
USG Metal Trim comes in two styles and two grounds to provide neat edge protection for veneer plastering at cased openings and ceiling or wall intersections. All have fine-mesh expanded flanges to strengthen plaster bond and eliminate shadowing. **No. 701-A,** channel-type, and **No. 701-B,** angle edge trim, provide 3/32″ grounds for two-coat systems. **No. 801-A,** channel-type, and **No. 801-B,** angle edge trim, provide 1/16″ grounds for one-coat systems. **Sizes:** for ½″ and ⅝″ IMPERIAL Gypsum Base.

USG P-1 Vinyl Trim is a channel-shaped rigid trim with flexible vinyl fins which compress on installation to provide a positive acoustical seal comparable in performance to one bead of acoustical sealant. For IMPERIAL Plaster partition perimeters. **Length:** 8, 9 and 10 ft. **Sizes:** for ½″ and ⅝″ gypsum base.

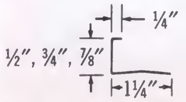
USG P-2 Vinyl Trim is a channel-shaped vinyl trim with a pressure-sensitive adhesive backing for attachment to the wall at wall-ceiling intersections. Provides positive perimeter relief in radiant heat and veneer plaster systems. Allow ⅛″ to ¼″ clear space for insertion. **Length:** 10 ft.

USG Control Joint relieves stresses of expansion and contraction in large plastered areas. Made from roll-formed zinc, it is resistant to corrosion in both interior and exterior uses with gypsum or portland cement plaster. An open slot, ¼″ wide and ½″ deep, is protected with plastic tape which is removed after plastering is completed. The perforated short flanges are wire-tied to metal lath or stapled to gypsum lath. Thus the plaster is key-locked to the control joint, which not only provides plastering grounds but can also be used to create decorative panel designs. **Limitations:** Where sound and/or fire ratings are prime considerations, adequate protection must be provided behind the control joint. USG Control Joints should not be used with magnesium oxychloride cement stuccos or stuccos containing calcium chloride additives. **Sizes and grounds:** **No. 50,** ½″; **No. 75,** ¾″; **No. 100,** 1″ (for use with exterior stucco curtain walls)—10-ft. lengths.

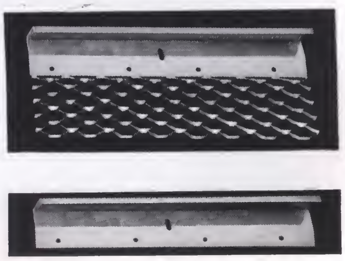
USG Control Joint No. 093 applies the same functions of the regular control joint (above) to veneer plaster installations. Made of zinc, with 3/32″ ground dimension and a tape-protected ¼″ opening 7/16″ deep. Used from floor to ceiling in long parti-



#66 Square Edge



#66 Square Edge



Casing Beads

tion runs, and from header to ceiling above door frames. **Lengths:** 8 and 10 ft.

USG Casing Beads are used as a plaster stop and as exposed trim around window and door openings; also recommended at junction or intersection of plaster and other wall or ceiling finishes. May be used with USG Metal Lath, Rocklath Gypsum Plaster Base, or masonry construction. In order to insure proper grounds for plastering, ¾″ casing beads are recommended for use with metal lath, ⅝″ beads with all masonry units, ⅞″ beads when the flange is applied *under* Rocklath Plaster Base, ½″ beads when the flange is applied *over* Rocklath. Available in #66 Square Edge with 1¼″ solid or 3⅛″ expanded flange. Expanded flange type also comes in ½″ and ¾″ beads, 10-ft. lengths, made from zinc alloy for exterior applications.

Imperial Tape is a special 2½″ wide glass fiber open-weave tape designed to reinforce joints of large-size Imperial and USG R.H. Bases prior to finishing with the veneer plasters of those systems. Open weave of tape allows rapid air escape during plaster embedding; highly crack resistant. Two types: P, pressure-sensitive, and S, staple-attached.

4. USG Lath Attachment Accessories

description

A complete line of specially formed steel clips and self-drilling steel screws provides positive attachment and rapid erection of gypsum plaster bases and metal lath. Variations are used with different U.S.G. partition and ceiling systems.

Bridjoint Field Clip B-1 is used to support and align end joints of Rocklath which do not fall opposite structural members; for ⅜″ lath.

Brace-Tite Field Clip BT-1 is used for suspended ceilings, exterior wall and beam furring and hollow pipe chase partitions. Provides support across full width of lath. For use with standard ¾″ cold-rolled channels spaced 16″ o.c.

Brace-Tite Starter Clip BT-1 is used in conjunction with BT-1 field clip to start first course of lath.

Trus-Lok Field Clip TL-1 is designed for attaching ⅜″ Rocklath Plaster Base to Trussteel Studs.

Trus-Lok Starter Clip TL-2 is used with TL-1 clips, MS-1 clips and runner track to start first course of lath.

Trus-Lok Drive-In Clip is used to anchor (1) bottom course of lath in direct attachment to Trussteel Studs or USG Steel Studs, and (2) top course of lath in partitions to underside of monolithic concrete flat slab or concrete joist filler construction; also as starter-finisher clip in steel stud-Rocklath partition.

MS-1 Clip provides quick direct attachment of ⅜″ Rocklath to channel-type USG Steel Studs. Clip is slipped behind stud flange and down over lath.

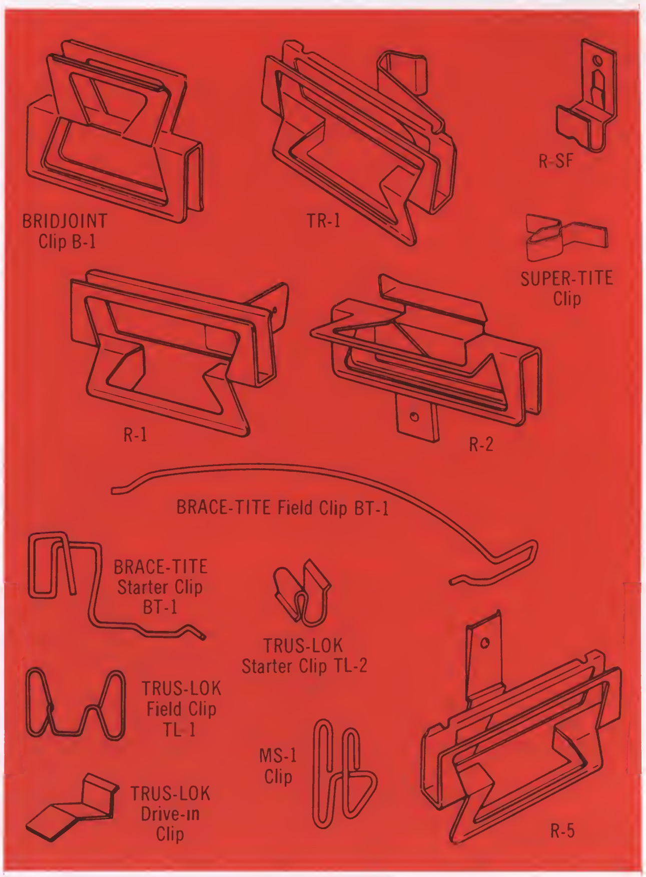
Resilient Clip TR-1 attaches ⅜″ Rocklath to Trussteel Studs spaced 16″ o.c., furs lath ⅜″ from stud face.

Resilient Starter-Finisher Clip R-SF is used with starting and last courses of resiliently attached Rocklath Plaster Base on wood studs or Trussteel snap-in runner track.

Super-Tite Clip, applied with a special gun, firmly attaches diamond mesh lath to Trussteel Studs (see page 6).

Resilient Clip R-1, for wood studs or joists spaced 16″ o.c., is attached by nailing with 13-ga., 1⅛″ lathing nail. Rocklath is floated ⅜″ free of framing members and held in place by prongs of clip. Resiliently attached Rocklath ceilings require three-coat plastering.

Resilient Clip R-2 is for internal angles of wood frame construction when both surfaces are resiliently furred. Furs lath ⅜″ from framing.



Resilient Clip R-5 is for masonry walls or face attachment over sound deadening board. Rocklath is resiliently furred ½″ from face.

USG Brand Screws are recommended for attachment of large-size Imperial and USG R.H. Base, as well as of Rocklath Plaster Base in certain applications. Many different self-drilling, self-tapping steel screws are used in plastering systems, applied by power-driven screw gun. They comply with ASTM C646. Applications are listed below.

USG Brand Screws—size & type	fastening applications
⅞″, 1″, 1⁵⁄₁₆″ and 1⅝″ Type S—Bugle Head	Single and double-layer IMPERIAL Base to steel studs, metal furring; (1″ screw only) IMPERIAL and USG R.H. Bases to RC-1 Resilient Channel
1¼″, 1⅞″, 2¼″ & 2⅝″ Type S—Bugle Head	Core units and face-layer IMPERIAL Base to steel runners in caged beam fireproofing
1″, 1¼″, 1⅝″ 1⅞″, 2″, 2⅜″ and 2⅝″ Type S-12—Bugle Head	Metal lath, gypsum sheathing and IMPERIAL Base to steel studs in curtain wall assemblies
1″, 1⅝″ & 2¼″ Type S or S-12—Trim Head	Wood trim over single and double-layer IMPERIAL Base to steel studs and runners
⅜″ Type S—Pan Head or Hex Washer Head	Steel studs to steel runners
⅜″, ½″ Type S-12—Pan, Hex Washer or Low-Profile Head	Steel studs to runners, metal door frame
1¼″, 1⅝″, 2¼″ Type S—Oval Head	Cabinets to steel studs and RC-1 Resilient Channel
1¼″ Type W or S—Bugle Head	Single-layer IMPERIAL and USG R.H. Bases to wood framing; RC-1 Channels to wood framing
1½″ Type G—Bugle Head	Face-layer IMPERIAL Base to base-layer IMPERIAL Base in laminated partitions

5. USG Structural Accessories

description

U.S.G. leads the industry in the development and acceptance of structural components for plastering systems. Included are non-load bearing studs of the truss and channel types, runner tracks, shoes and screws as needed; furring and lathing channels, and an adjustable wall furring bracket.

Trussteel Studs are used for framing hollow, fire-resistant partitions and curtain walls. They are formed from cold-drawn 7-ga. steel wire rods with tensile strength of 90,000 psi. A continuous diagonal wire web is welded to double wire flanges to provide an open-web design that readily accommodates pipes, conduits and ducts without impairing the partition's strength. Fabricated in five stud widths: 1⅝″, 2½″, 3¼″, 4″ and 6″, factory-cut to job lengths.

Trussteel Snap-In Runner Track anchors the partition, permits stud to snap into place eliminating the need for stud shoes. When this track serves as a ceiling runner, stud shoes are used if a fire rating is required. Available for all except 6″ width of studs; 10-ft. lengths.

Trussteel Runner Track is used with Trussteel Stud Shoes to anchor the partition at floor and ceiling, particularly where floor-to-ceiling height varies considerably. Available for all stud widths; 10-ft. lengths.

Trussteel Stud Shoes, 7″ long and made from 24-ga. steel, are used to connect studs to runner track. Permit up to 4″ adjustment in partition height.

Design Data—Trussteel Studs

stud size—(widths)	1⅝″	2½″	3¼″	4″	6″
weight—(lbs. per 1000 ft.)	440	455	470	485	515
deflection(1)	.355″	.168″	.117″	.094″	.072″
gauge	7-ga. (diameter .177) chords and diagonals				
tensile strength	85,000 psi—yield point				
percent of open area	67%	79%	84%	87%	91%

(1)Deflections of TRUSSTEEL Studs with 100-lb. concentrated load in a 5-ft. span are below the maximum allowable deflections of .20″ for 2½″ studs, .15″ for 3¼″ studs, and .10″ for 4″ and wider studs specified in the requirements of the United States Corps of Engineers, General Services Administration, and Veterans Administration.

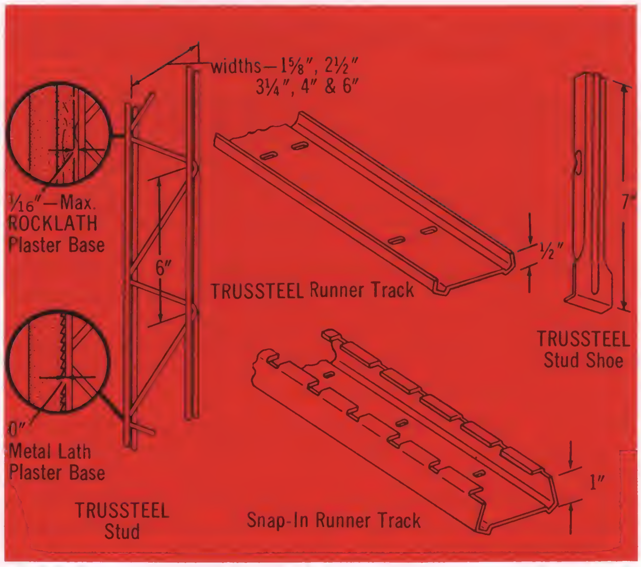
Structural Properties—Trussteel Studs

stud size	major axis			minor axis		
	I_x in⁴	S_x in³	r_x in	I_y in⁴	S_y in³	r_y in
1⅝″	0.052	0.064	0.725	.0033	.0123	.1824
2½″	0.132	0.106	1.162	.0033	.0123	.1824
3¼″	0.231	0.142	1.537	.0033	.0123	.1824
4″	0.365	0.183	1.916	.0033	.0123	.1824
6″	0.831	0.277	2.912	.0033	.0123	.1824

USG Steel Studs and Runners, channel-type and roll-formed from galvanized steel, are used in non-load bearing interior partition and exterior curtain wall systems. The secure, rigid screw or clip attachment of the gypsum base utilizes the full structural contribution of the lath and plaster membrane. Limited chaseways are provided by punchouts in the web. Assemblies using these studs are low in cost with excellent sound and fire-resistance characteristics. Available in various styles and widths to meet functional requirements outlined below:

Interior Partitions, Ceilings, Column Fireproofing—ST5 and ST10 stud styles in seven widths—1⅝″, 2″, 2½″, 3″, 3⅝″, 4″, 6″—and 8 to 16-ft. lengths. Runners in stud widths 12-ft. length.

Exterior Curtain Wall—studs are available in various styles to meet height requirements and in nine widths—2″, 2½″, 3″, 3½″, 3⅝″, 4″, 5½″, 6″, 7½″—lengths up to 28 ft. Runners in stud widths (with 1¼″ unhemmed leg), 10-ft. lengths.



Studs and Runners, Style ST5 comply with ASTM C645; materials for Style ST10 comply with Federal Specification QQS-698 and QQS-775d, Class d.

USG Metal Furring Channel is a roll-formed, galvanized steel ceiling and wall channel for screw attachment of Rocklath and Imperial Bases. Product complies with ASTM C645.

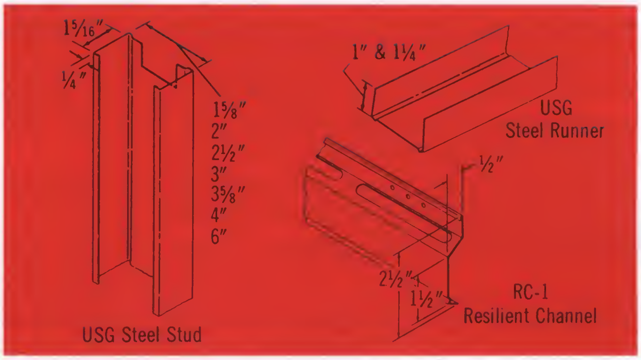
RC-1 Sheetrock Resilient Channel is a galvanized steel channel for resilient attachment of Imperial and USG R.H. Bases to wood or Trussteel Stud framing. One of the most effective, lowest-cost methods for improving sound control. Flange is prepunched for screw fastening to framing. Base is screw-attached to channel.

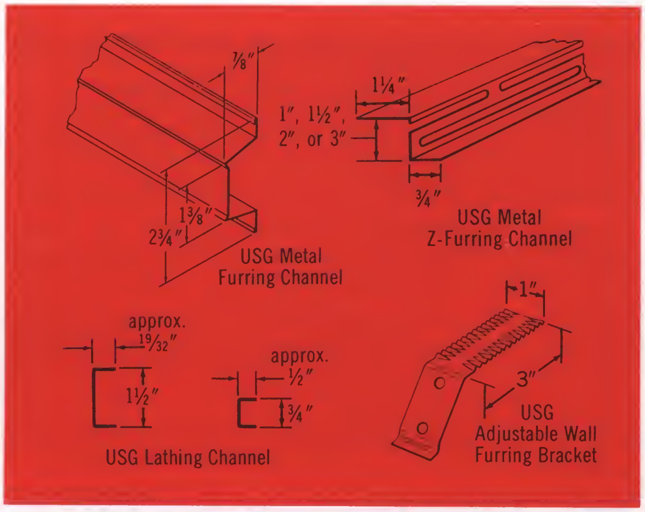
USG Z-Furring Channel is used to attach mineral-fiber insulation and Imperial Base to masonry walls. Made of hot-dip galvanized steel. Suitable for 1″ to 3″ thick insulation.

USG Plastic Grommets snap into 1¼″ round holes of USG Steel Studs for positive electrical insulation of wiring.

USG Adjustable Wall Furring Brackets are used to attach ¾″ furring channels to exterior masonry walls. Made of 20-ga. galvanized steel, they are wire-tied to horizontal stiffeners in braced furring systems. Furring depth: ¼″ to 2¼″ plus channel depth.

USG Lathing Channels are cold-rolled 16-ga. steel, either galvanized or black asphaltum painted; used for furring, suspended ceilings, partitions and ornamental lathing. **Sizes:** ¾″ and 1½″; 16-ft. length.





6. Veneer Plasters

IMPERIAL Plaster is a veneer interior product that trims days from plaster finishing schedules and provides exceptionally high strength and abrasion resistance (3,000 psi). Its applied cost averages only slightly above conventional drywall cost. Applied to thickness of 1/16" to 3/32"; requires only the addition of clean water. Qualifies for ratings of up to two hours and 53 STC in steel and wood-frame assemblies. Complies with ASTM C587 and Federal Specification SS-P-00402B, Type VI. Available in two types:

IMPERIAL *Finish Plaster*—for single-coat application composed of scratch coat and immediate doubling back directly over special IMPERIAL Gypsum Base, glass-fiber tape and special corner bead or over IMPERIAL Basecoat Plaster in two-coat system. Provides a smooth trowel, float, or spray texture finish ready for decoration.

IMPERIAL *Basecoat Plaster*—for use where two-coat application and a high-strength conventional finish are preferred. Can be applied to either IMPERIAL Gypsum Base, directly to concrete block or over a bonding agent on monolithic concrete. Formulated to receive IMPERIAL Finish Plaster, DIAMOND Interior Finish, high-strength gauged lime putty, STRUCTO-GAUGE-lime, or Keenes-lime-sand float finishes.

Both types are available in machine and hand-applied formulations. The machine-application basecoat and finish are spray-applied in a patented process.

DIAMOND Interior Finish is a white finish formulated for hand application directly over IMPERIAL Gypsum Base or in a two-coat system over IMPERIAL Basecoat Plaster. Applied to a nom. 1/16" thickness, this finish is *unaggregated* for a smooth or skip-trowel finish; may be job-aggregated for float or other textures. Fast-applying; can be decorated in 24 hours with breather-type paint or left undecorated. Not recommended for use over portland cement basecoat or masonry surfaces.

Should be applied to IMPERIAL Gypsum Base having blue face paper. Faded base should be treated with alum solution before finish is applied to prevent possible bond failure. See U.S.G. Bulletin P-503 for specifics.

RED TOP Radiant Heat Basecoat and Finish Plasters are high-density formulations for use with electric cable ceilings. Allow higher operating temperatures than with other products, provide more heat transmission and greater resistance to heat deterioration. Basecoat is hand or machine-applied to cover cable. Finish Coat is applied 1/16" to 3/32" to bring total plaster thickness to 1/4" over special USG R.H. Base attached to wood joists (see U.S.G. Bulletin P-480), to metal furring channel or suspended metal grillage, or to 3/8" thickness over a bonding agent directly to monolithic concrete ceilings. Mill-prepared, requires addition of water only. Meets NEC requirements. UL listed.

(Above) Finish plaster ready for application.

(Left) Test demonstrates IMPERIAL Plaster's superior abrasion resistance. When scoured 250 times by a 25-lb. weighted brush, penetration into the finish was never more than one millimeter.

7. Basecoat Plasters

description

USG Basecoat Plasters can be applied by either hand or machine methods, on gypsum or metal lath; gypsum or clay tile; concrete or cinder blocks, or other approved plaster bases.

limitations

1. Where sound isolation is the prime consideration, use sand aggregate only.

2. Over interior monolithic concrete, a high-quality plaster bonding agent should be applied before plastering.

3. Gypsum plasters should not be used where they will come in contact with water or excessive moisture. They may be applied to exterior soffits that are protected from direct exposure to rain and moisture, and have suitable drips and casings provided along edges.

4. Plaster application on masonry or concrete walls, or ceilings that have been coated with bituminous compounds or other waterproofing agents, is not recommended. Exterior walls should be furred and lathed prior to plastering to prevent seepage and condensation.

5. The only USG plaster recommended for the embedment of electric heat cables is RED TOP Radiant Heat Basecoat Plaster backed by USG R.H. Base or applied directly to monolithic concrete. See U.S.G. Bulletin P-480.

RED TOP Wood Fiber Plaster is a gypsum plaster containing fine particles of selected wood fiber. It normally requires the addition of water only; however, when used over masonry plaster bases or for machine application, 1 cu. ft. of sand

per 100 lb. of plaster must be added, and when used as a scratch or brown coat, 1 cu. ft. of sand may be added. Wood fiber plaster can be applied to all standard lath and masonry plaster bases; strongly recommended as a scratch coat for metal lath. Complies with ASTM C28 and Federal Specification SS-P-00402B Type III.

Red Top Gypsum Plaster is a gypsum basecoat requiring the addition of aggregate and water on the job. Supplied in three types: *Regular*—for use with sand aggregate, hand application; *LW*—for use with lightweight aggregate, hand application; *Machine Application*—for use with sand or lightweight aggregate. Complies with ASTM C28 and Federal Specification No. SS-P-00402B, Type II. **Limitation:** not recommended for use with perlite aggregate when machine applied, with vertical lift over 30 ft. or hose length over 150 ft.

Red Top Two-Purpose Plaster is a gypsum basecoat requiring the addition of aggregate and water on the job. Suitable for either hand or machine application and use with sand or lightweight aggregate meeting ASTM C35. Two-Purpose Plaster complies with ASTM C28 and Federal Specification No. SS-P-00402B, Type II. **Limitation:** not recommended for use with perlite aggregate when machine applied, with vertical lift over 30 ft. or hose length over 150 ft.

Structo-Base Gypsum Plaster is a special gypsum basecoat plaster that develops higher strengths than conventional plasters. Recommended for handball courts, hospital corridors, schools, etc., wherever a high-strength basecoat plaster is necessary. Complies with Federal Specification SS-P-00402B, Type II, and ASTM C28 for "gypsum neat plaster" including the added requirement of 2,800 psi compressive strength.

Structo-Lite Gypsum Plaster is a mill-mixed perlite aggregated gypsum plaster which requires the addition of only water at the job site. It is formulated in three types: *Regular*—for use over gypsum or metal lath; *Masonry*—for use on high suction unit masonry base only; *Type S*—for specific UL-listed assemblies.

Structo-Lite weighs less than half as much as sanded basecoat plaster; has a "k" factor of 1.74, providing three times the insulation value of sanded plaster. Over-all cost is comparable to job-mixed lightweight aggregate plaster. Complies with Federal Specification SS-P-00402B, Type I and ASTM C28 for gypsum ready-mixed plaster. **Limitations:** (1) Not recommended over metal lath when a smooth trowel lime finish is to be used. It may be sand-float finished, or used as a base for acoustical tile. (2) Not recommended for machine application with vertical lift over 30 ft. or hose length over 150 ft.

Portland Cement-Lime Plaster is used for interior applications where high-moisture conditions exist, or for exterior stucco. Prepared as follows:

Job-mixed Stucco—Mix Bondcrete or Mortaseal Mason's Lime with portland cement and sand in accordance with ANSI A42.2, Type L. Suggested proportions: *scratch coat*—1 bag portland cement, ¾ to 1 bag lime, 5 to 6 cu. ft. sand; *brown coat*—1 bag portland cement, 1 bag lime, 6 to 7 cu. ft. sand; *finish coat*—1 bag portland cement, 2 bags lime, 7 to 10 cu. ft. sand.

Prepared Finish—Oriental Exterior Finish Stucco (mill-mixed), a white or colored float or texture finish.

Limitations of portland cement plaster: (1) Scratch, brown and finish coats require curing with water after set; (2) Must not be applied directly to smooth, dense surfaces, gypsum lath or gypsum block. Self-furring metal lath must be secured to such surfaces before plaster is applied; (3) Control joints should be provided to compensate for shrinkage during drying; (4) A Keenes cement-lime putty finish must never be used over a portland cement basecoat.

Technical Data—Basecoat Plasters

plaster		mix	compressive strength psi—dry (1)	weight lb. cu. ft. —dry	conductivity (k)
STRUCTO-LITE	(regular)		600-800	50	1.74
wood fiber		neat	1500-2000	82	3.15
wood fiber	(sand)	100:1	1200-1600	97	—
STRUCTO-BASE	(sand)	100:2	2800-3200	124	—
		100:2½	1900 min.	120	—
		100:3	1400 min.	118	—
RED TOP Gypsum, and Two-Purpose Plasters mixed with—	sand	100:2	750-1100	107	5.51
		100:2½	650-850	108	—
		100:3	550-750	109	5.60
	perlite	100:2	600-800	48	1.64
		100:3	450-600	41	1.31
	vermiculite	100:2	400-525	48	1.74
		100:3	250-325	41	1.42

(1) Average Laboratory Test Results. Figures may vary slightly for products from individual mills. Tested in accordance with ASTM C472. Aggregate is in cu. ft.

Use of Aggregates with Gypsum Plasters

maximum recommended proportions

plaster base	no. of coats	type of coats	maximum quantity of aggregate, in cu. ft. to be used with 100 lb. of neat gypsum plaster			
			under smooth trowel finishes		under other finishes	
			sand (1)	perlite	sand (1)	perlite
GYPSUM LATH	3	scratch	2	2	2	2
		brown	3	2	3	3
	2	basecoat	2½	2	2½	2
METAL LATH	3	scratch	2	—	2	2
		brown	3	—	3	2
UNIT MASONRY	3	scratch	3	3	3	3
		brown	3	3	3	3
	2	basecoat	3	3	3	3

(1) Approximately six No. 2 shovels of sand equal 1 cu. ft. One shovel equals 15 lb.
Note: In a construction system which has metal lath as the plaster base, perlite or vermiculite aggregate is not recommended for use in the basecoat plaster, unless a float or acoustical tile finish is used.

Thermal Coefficient of Expansion (unrestrained)
[Inches/Inch/°F. (40°—100°F.)]

Sanded Gypsum Plaster (100:2, 100:3)	$7.0x10^{-6}$
Wood Fiber Plaster (sanded 100:1)	$8.0x10^{-6}$
Gypsum Lath	$9.0x10^{-6}$

Hygrometric Coefficient of Expansion (unrestrained)
[Inches/Inch/% R.H. (5%—90% R.H.)]

Gypsum Lath	$5.4x10^{-6}$
Sanded Gypsum Plaster (100:2, 100:3)	$1.5x10^{-6}$
Structo-Lite Plaster (regular)	$4.8x10^{-6}$
Vermiculite Gypsum Plaster (100:2)	$3.8x10^{-6}$
Wood Fiber Plaster (sanded 100:1)	$2.8x10^{-6}$

8. Finish Coat Plasters

description

There are several types of gypsum finish plasters; some used with the addition of water only, and others which are a blend of gypsum, lime and water, or gypsum, lime, sand and water.

Since the finish coat must be compatible with the basecoat, care must be taken in the selection of the finish coat materials in relationship with the characteristics of the basecoat. See Application Data and limitations below.

limitations

1. A smooth trowel finish should not be used over lightweight aggregate gypsum basecoat applied over metal lath. A sand float finish is recommended.

2. Where the gypsum basecoat is Structo-Lite or contains lightweight aggregate (perlite or vermiculite) and a smooth trowel finish is used, the finish coat should be Red Top Gauging Plaster and lime, with addition of ½ cu. ft. of perlite fines of 50 lb. of No. 1 white silica sand per 100 lb. gauging plaster, or a factory-aggregated gauging plaster.

3. Gypsum or lime base finishes, including Keenes cement, should not be used directly over a portland cement basecoat or over concrete block or other masonry surfaces.

4. In smooth trowel finishes, gauging plasters providing an extremely hard surface, such as Structo-Gauge and Keenes cement, must not be used over Structo-Lite Plaster or a basecoat with a lightweight aggregate.

Oriental Exterior Finish Stucco is a mill-prepared, water-resistant finish for use over portland cement-lime basecoats only. Requires addition of water only. Float, texture, stipple, sponge, spatter-dash or rough coat finishes may be used; not designed for smooth trowel finish. Available in white and 7 colors for hand or spray application.

gauging plasters (for blending with lime putty)

Structo-Gauge Gauging Plaster is a high-strength gypsum gauging plaster that provides extreme hardness, resistance to surface abrasion; Quick or Slow Set. Used only over a high-strength basecoat—wood fiber, sanded gypsum, Structo-Base or Imperial Basecoat Plaster. Complies with ASTM C28 and Federal Specification SS-P-00402B, Type V, with the added requirement of 5,000 psi compressive strength (neat).

Red Top Keenes Cement—A dead-burned gypsum gauging, which requires extensive troweling except in regular sand float finishes. This troweling densifies the surface for hardness and resistance to surface abrasion. Complies with ASTM C61 and Federal Specification SS-C-161A Type I (Regular), II (Quick Troweling).

Champion and Star White Gauging Plaster—These are conventional quick and slow-set gauging plasters available

application data—USG Interior Finish Coat Plasters

description	finish texture	physical properties	proportion by dry weight gauging to lime	workability factor	comments
STRUCTO-GAUGE and Lime Putty	Smooth Trowel	Extremely hard and resistant to abrasion	1:1	2	Use for handball courts, corridors over a wood fiber, STRUCTO-BASE or IMPERIAL Basecoat Plaster.
		Hard and resistant to abrasion	1:2	1	Use over a wood fiber, sanded gypsum or IMPERIAL Basecoat Plaster.
Keenes Cement and Lime Putty	Smooth Trowel	Hard and resistant to abrasion	4:1	7	Use for handball courts and psychopathic wards over a wood fiber basecoat.
		Medium hard and resistant to abrasion	2:1	4	Use for hospitals and schools over a wood fiber or sanded gypsum basecoat.
Gauging Plaster and Lime Putty	Smooth Trowel	Standard	1:2	1	For normal use; over lightweight aggregate basecoat add ½ cu. ft. of perlite fines or 50 lb. of #1 silica sand per 100 lb. gauging.
Keenes Cement, Lime Putty and Sand	Float Finish	Hard	100 lb. Keenes 50 lb. Lime 400 lb. Sand	1	Commonly used float finish, may be satisfactorily colored.
Gauging Plaster, Lime Putty and Sand	Float Finish	Standard	50 lb. Gauging 100 lb. Lime 400 lb. Sand	1	For normal use over any basecoat.
IMPERIAL Finish Plaster	Smooth Trowel or Float Finish	Hard and resistant to abrasion	Neat	1	For use over IMPERIAL Gypsum Base or over IMPERIAL Basecoat Plaster.
DIAMOND Interior Finish	Smooth Trowel Texture or Float Finish	Medium hard and resistant to abrasion	Neat	1	For use over IMPERIAL Gypsum Base or over IMPERIAL Basecoat Plaster.
RED TOP Radiant Heat Finish Plaster	Smooth Trowel, Texture or Float Finish	Extremely dense; resists heat deterioration	Neat	1	Use over RED TOP Radiant Heat Basecoat Plaster in wood frame, metal grillage, concrete ceilings.

with perlite fines for use over lightweight aggregated basecoats, or unaggregated for use over sanded basecoats. Comply with ASTM C28 and Federal Specification SS-P-00402B, Type V.

Red Top Gauging Plaster—Similar to Champion and Star Gauging except it comes in a slightly darker color. Available either perlited or unaggregated. Complies with ASTM C28 and Federal Specification SS-P-00402B, Type V.

Monotron Surface Hardness (1)

(Lb. required to force a 10 mm. diameter steel ball .01″ into plaster face)

gauging-lime ratio (dry weight)	STRUCTO-GAUGE	regular gauging	Keenes Cement	
			regular	quick-troweling
1:2	106	75		
1:1	236			
2:1			75	112
4:1			88	139

(1) Avg. laboratory-tested values when applied over sanded basecoat.

finishing limes

Ivory and Snowdrift Finish Limes—Autoclaved—Products are 92% hydrated finishing limes. Do not require soaking, and virtually eliminate the possibility of future expansion within the finish coat because of unhydrated magnesium oxides. Comply with ASTM C206, Type S, and Federal Specification SS-L-351B, Type F.

Red Top and Grand Prize Normal Hydrate Finish Limes—Hydrate limes which require soaking at least 16 hours to develop proper plasticity and the degree of hydration necessary prior to use. Comply with ASTM C6, Type N, and Federal Specification SS-L-351B, Type F.

9. Special Plasters

Red Top Moulding Plaster is used in specialized work such as cast ornamental enrichments or running cornices. The grind is conducive to fine detail; controlled set helps obtain exact reproduction. Available in white and grey colors. Complies with ASTM C28 and Federal Specification SS-P-00402B, Type V.

Red Top Casting Plaster, for general casting shop use, produces excellent detail in fine plaques and art statuary. The material has outstanding characteristics of plasticity, surface hardness, strength. Only water is added.

general lathing and plastering specifications

notes to architect

The following recommendations and specifications are minimum basic guides for preparation of job specifications. They are for normal construction and are not intended to cover every possible design or job condition.

Detailed specifications for the various systems are provided in pertinent U.S.G. System Folders.

Zinc alloy accessories are recommended where corrosion due to high humidity or saline content of aggregate is possible.

Part 1: general

1.1 scope—*Specify areas to receive this treatment.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials, except water and sand, shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather, all glazing shall be completed and the building heated to minimum of 55°F. before lath installation. Temperature of building shall be maintained in uniform range above 55°F. for an adequate period prior to application of plaster, while plastering is being done, and after plaster is dry. Heat shall be well distributed in all areas, with deflection or protective screens used to prevent concentrated or irregular heat on plaster areas near source. When required, heat shall be furnished by (   ).

b. Ventilation shall be provided to properly dry conventional plaster during and subsequent to its application. In glazed buildings, this shall be accomplished by keeping windows open sufficiently to provide air circulation; in enclosed areas lacking normal ventilation, provisions must be made to mechanically remove moisture-laden air. For veneer plaster, a minimum ventilation level shall be maintained until the plaster has set and dried.

c. If glazed sash are not in place and the building is subjected to hot, dry winds or temperature differentials from day to night of 20°F. or more, openings shall be screened with cheesecloth or similar material.

1.5 protection

Proper protection shall be provided during plastering for finished door and window frames and other designated areas which do not receive a plaster finish.

Part 2: products

2.1 lathing materials

a. Plaster Base: (Rocklath Plaster Base (thickness), (regular), (Firecode), (Foil-Back).)

(Imperial Gypsum Base (thickness), (Regular) (Firecode) (Firecode "C").) *Specify only with IMPERIAL Plaster, #800 or #900 Corner Bead and IMPERIAL Joint Reinforcement Tape.*

(USG R.H. Base (thickness).) *Specify only with RED TOP Radiant Heat Plasters and IMPERIAL Joint Reinforcement Tape.*

(USG Metal Lath (weight), (Junior Diamond Mesh) (USG Poly-Backed Metal Lath) (Z-Riblath) (⅜″ Riblath) (Expanded Metal Stuccomesh).)

b. Reinforcement: (USG 1-A, Double-Ex, 4-A, #800, #900 Corner Bead, Cornerite, Striplath.)

c. Control Joint: USG Control Joint (#50, #75, #100 or #093).

d. Casing Bead: (size) #66 USG Casing Bead or USG Metal Trim (701-A) (701-B) (801-A) (801-B).

e. Lath Attachment Clips: (Bridjoint Clip B-1; Brace-Tite Field Clip or Starter Clip BT-1; Trus-Lok Field Clip TL-1, Starter Clip TL-2, Drive-In Clip TL; Field Clip MS-1; Super-Tite Clip; USG Resilient Clip TR-1, R-SF, R-1, R-2, or R-5).

f. Screws: (⅞″, 1″, 1¼″, 1⁵⁄₁₆″, 1⅝″, 1⅞″, 2¼″, 2⅜″ or 2⅝″ USG Brand Type S or S-12, Bugle Head) (1″, 1⅝″ or 2¼″ USG Brand Type S, Trim Head) (⅜″ USG Brand Type S Pan Head or Hex Washer Head) (⅜″ or ½″ USG Brand Type S-12 Pan Head, Hex Washer Head or Low-Profile Head) (1¼″, 1⅝″ or 2¼″ USG Brand Type S Oval Head) (1¼″ USG Brand Type W) (1½″ USG Brand Type G).

g. Furring Channels: (USG Metal Furring Channels) (USG Z-Furring Channels).

h. Steel Studs: (size) (Trussteel Studs, used with Trussteel Snap-

In or Trussteel Runner Track, Trussteel Stud Shoes) (USG Steel Studs, used with USG Steel Runner).

i. Furring Brackets: USG Adjustable Wall Furring Brackets.

j. Lathing Channels: USG Lathing Channels.

k. Resilient Channels: RC-1 Sheetrock Resilient Channels.

2.2 plastering materials

a. Basecoat Plaster: (Structo-Base Gypsum Plaster) (Red Top Wood Fiber Plaster) (Red Top Gypsum Plaster) (Red Top Two-Purpose Plaster) (Structo-Lite Plaster) (Imperial Basecoat Plaster) (Red Top Radiant Heat Basecoat Plaster).

b. Aggregate: (Sand) (Perlite) meeting ASTM C35 requirement. Sand for float finishes shall be graded (white) silica sand passing a (30 mesh) (20 mesh) screen.

c. Water: Potable and not contain impurities that affect the setting of gypsum.

d. Finish Lime: (Ivory) (Snowdrift) (Grand Prize) (Red Top).

e. Gauging Plaster: (Structo-Gauge) (Keenes Cement) (Star) (Champion) (Red Top).

f. Prepared Finish: (Imperial Finish Plaster) (Diamond Interior Finish) (Red Top Radiant Heat Finish Plaster).

g. Exterior Stucco Finish: Oriental Exterior Finish.

h. Grout: (Red Top Gypsum Plaster) (Structo-Lite Basecoat).

i. Plaster Ornaments and Mouldings: Red Top (Moulding) (Casting) Plaster.

2.3 mixes

a. Basecoat Plaster (and Aggregate) shall be mixed in proportions of ________ (specify from technical data, page 8).

b. Finish Plaster shall be mixed in proportion by dry weight of ________ parts of gauging to ________ parts of lime (specify from application data, page 9), according to the manufacturer's directions. Over lightweight aggregate basecoats, add ½ cu. ft. of perlite fines or 50 lb. of No. 1 silica sand per 100 lb. of gauging plaster, or use mill-aggregated gauging.

c. Ivory or Snowdrift Lime shall be box-soaked or machine-mixed for immediate use with approx. 5½ to 6 gallons of water for each 50-lb. bag.

d. Grand Prize or Red Top Lime shall be box-soaked or machine-mixed using approx. 6 gallons of water per 50-lb. bag, and allowed to soak for 16 hours.

Part 3: execution

Refer to appropriate System Folders for detailed specifications on lathing and accessories application. For lathing and plastering specification for handball courts, refer to U.S.G. Bulletin PM-125.

3.1 control joint installation

Where indicated on drawings, attach USG Control Joints (size) with Bostitch 9/16″ "G" staples or equal spaced not over 6″ apart in each flange. (Control Joints Nos. 50, 75, 100—splice ends together with 16-ga. tie wire inserted into openings in the key-lock sections.) (Control Joint No. 093—square-cut end joints, butt together and align for neat fit.) Remove protective tape after plastering.

a. Interior Ceilings—space control joints not exceeding ( ) ft. in either direction and with the area of separated sections not exceeding ( ) sq. ft. (see pertinent U.S.G. System Folders). Break lath behind control joints; where channel framing is used, also break the channels. Position control joints to intersect light fixtures, heating vents, air diffusers, etc.

b. Interior Walls and Partitions—space control joints maximum of 30 ft. apart; control joints may occur over door frames as indicated in drawings.

c. Exterior Soffits of Gypsum Plaster—space control joints not exceeding 25 ft. in either direction. Break lath and channel behind control joints. All other specifications listed above are applicable.

d. Exterior Walls, Soffits and Canopies of Portland Cement Stucco—space control joints not exceeding 10 ft. in either direction. Where there is an intersection of vertical and horizontal joints, use continuous horizontal joint and butt the vertical joint. Caulk splices and intersections exposed to the elements with a silicone rubber caulking cement. In soffits and canopies, break lath and channel behind control joints.

3.2 plaster thicknesses shall be as shown on plans; however, in no case shall the grounds be less than:

USG Metal Lath—⅝″ (from face of lath)
Rocklath Plaster Base—½″
Masonry Units—⅝″
Monolithic Concrete Ceilings—⅛″ (⅜″ maximum)
Monolithic Concrete Walls—⅛″ (⅝″ maximum)
Imperial Plasters—1/16″ to 3/32″ (over special gypsum base)
Red Top Radiant Heat Plasters—¼″ (over special gypsum base); ⅜″ (over monolithic concrete)

3.3 basecoat application—Mix basecoat plasters by hand or in a mechanical mixer to a uniform consistency following manufacturer's directions. Apply basecoat plaster by (hand) (machine) in (1) (2) coats. Monolithic or unit masonry surfaces that exhibit high suction shall be moderately wetted immediately before plastering.

a. Two-coat work: Over gypsum lath and masonry, apply base (first) coat with sufficient material and pressure to form good bond to base and to cover well, and then double back to bring plaster out to grounds. Straighten to a true surface with rod and darby without use of additional water and leave rough to receive finish (second) coat.

b. Three-coat work: Apply scratch (first) coat with sufficient material and pressure to form good full keys on metal lath, and good bond on other bases, and then cross-rake. Apply brown (second) coat after scratch (first) coat has set firm and hard. Bring out to grounds and straighten to a true surface with rod and darby without use of additional water. Leave rough to receive finish (third) coat.

3.4 special applications

a. Solid Studless Metal Lath Partition: Apply scratch coat to side opposite bracing, and allow to set and partially dry. Then apply brown coat to side opposite braces, allowing it to set thoroughly before removing temporary braces. Next apply brown coat to previously braced side to bring plaster out to grounds. Straighten to a true surface with rod and darby without use of additional water, and leave rough to receive finish coat.

b. Solid Channel Stud Metal Lath Partition: Apply scratch coat to lath side and allow to set and partially dry. Then apply back-up coat to channel side to full grounds, ½″ over channels, in not less than two operations and allow to set. Then apply brown coat on lath side to bring plaster out to grounds. Straighten to a true surface with rod or darby without use of additional water, and leave rough to receive finish coat.

c. Resilient Rocklath Plaster Base Ceiling: Use three-coat method only, allowing scratch coat to set and partially dry before applying brown coat.

d. Brace-Tite System Ceiling: The three-coat method is recommended. If the two-coat system is used, a minimum of 20 minutes must be allowed before doubling back and the setting time of the basecoat must not exceed 3 hours.

e. Monolithic concrete to which a plaster bonding agent is to be applied shall be free of dirt, dust, grease, wax, oil or other unsound surface conditions. Laitance, efflorescence and parting compounds shall be chemically removed. Apply plaster bonding agent to concrete surface in a continuous film according to manufacturer's directions. Apply basecoat plaster by firmly grinding a thin coat into the bonding agent. Immediately double back to a completed thickness of 1/16″ to 3/32″ having a level surface ready for finish plaster application.

f. Portland Cement Basecoats shall be proportioned (specify from page 8), and applied in two coats. Cross-rake scratch coat and after setting, damp-cure for not less than 48 hours. Damp-cure brown coat after setting for not less than 48 hours.

g. Imperial Basecoat Plaster: When applied directly over concrete block, fill all voids and depressions including joints; leave rough and allow to set prior to lime putty finish application. Spray concrete block uniformly with water immediately before applying Imperial Basecoat Plaster. Cover monolithic concrete surfaces with an application of plaster bonding agent prior to plastering. Red Top Accelerator may be used to quicken set. Total basecoat shall be 1/16″ to 3/32″ thick.

h. Imperial Basecoat Plaster: When applied directly to Imperial Gypsum Base, embed tape and fill beads, and allow plaster to set; then scratch and immediately double back to a thickness of 1/16″ to 3/32″, in accordance with manufacturer's directions.

i. Where plaster is flush with metal base, metal door frames, etc., groove at the junction to reduce the possibility of chipping. Cut basecoat plaster free from these metal sections before plaster sets.

j. Grout all steel door frames in solid plaster and steel stud partitions prior to lathing.

3.5 finish coat application

a. Trowel Finish Coats: Scratch plaster in thoroughly and immediately double back to fill out to a smooth, dense surface for decoration, free of surface blemishes and irregularities. Apply finish coat as thin as possible, preferably 1/16″ to not more than 1/8″ maximum thickness. Trowel Keenes Cement Finishes until the material sets.

b. Float Finish Coats: Scratch plaster in thoroughly and immediately double back to a true, even surface. Float using a (shingle) (cork) (wood) (carpet) or (rubber) float to bring aggregate to the surface to produce a finish of uniform texture free of slick spots, cat faces and other blemishes. Use water sparingly in natural color, and no water on colored finishes. With Oriental Exterior Finish Stucco, use no water in floating or texturing. Fog-spray surface with water for several days after setting.

c. Machine-Applied Spray Finishes: Apply plaster uniformly to produce a texture approved by the architect.

d. Imperial Finish Plaster: Over Imperial Gypsum Base embed tape, fill beads and allow to set; then scratch and immediately double back to a thickness of from 1/16″ to 3/32″, in accordance with manufacturer's directions. Over Imperial Basecoat Plaster, scratch and immediately double back to 1/16″ thickness.

e. Diamond Interior Finish: Over Imperial Gypsum Bases embed tape, fill beads and allow to set; then apply a thin, tight scratch coat over entire working area. Immediately double back with material from same batch to a nom. 1/16″ thickness. Over Imperial Basecoat Plaster, scratch and immediately double back to 1/16″ thickness.

f. Red Top Radiant Heat Plasters: In wood frame and metal grillage constructions, apply plasters according to manufacturer's specifications (see U.S.G. Bulletin P-480). In monolithic concrete ceilings, prepare the surface with plaster bonding agent in a continuous film. Apply Red Top Radiant Heat Plaster in same manner prescribed for wood frame ceilings except to total thickness of 3/8″—consisting of 5/16″ fill coat of Basecoat Plaster to completely cover the cable and anchor device, and 1/16″ coat of Finish Plaster.

3.6 ornamental plastering

Execute ornamental plaster in accordance with scale details shown on the drawings. Run cornices and mouldings full, straight and true with moulding plaster, using clean cut metal conforming to the profiles shown on the drawings. Align lines accurately with square intersections, and accurate miters at corners and angles. Prepare enriched ornamental work which cannot be run in place with Red Top Casting Plaster cast in gelatine molds. Back the work solidly with jute or burlap and properly reinforce with galvanized steel. Anchor securely with copper wires not lighter than 16 gauge. Make all joints carefully and point neatly so as to be invisible. Sandpaper rough spots and leave the entire work in proper condition, ready for decoration.

3.7 patching

Point up around trim and other work. Cut out and patch defective and damaged plaster. Patch plaster to match existing work in texture and finish flush and smooth.

3.8 completion

At the completion of the finish plaster work, clean all plaster from beads, screeds, metal base and metal trim, leaving work ready for decoration by others. Remove all plaster rubbish, excess material, scaffolding, tools and other equipment from the building, leaving floors broom clean.

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NOTE: All products described here may not be available in all geographic markets. Consut your local U.S.G. sales office or representative for information.

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UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606
SA-917/USG/1-77

improved fire-resistant drywall partitions for enclosing shafts in multi-story buildings

USG Cavity Shaft Walls have been improved for greater economy but still retain all previous high-performance characteristics. Engineering modifications provide a thinner, lighter weight assembly that offers faster installation and lower material costs, producing lower in-place costs as well as savings in structural steel. In addition, USG Shaft Walls provide up to 4-hour fire resistance and sound ratings to 51 STC. They resist lateral loads up to 15 psf; also resist fatigue failure under cyclic lateral loading.

description

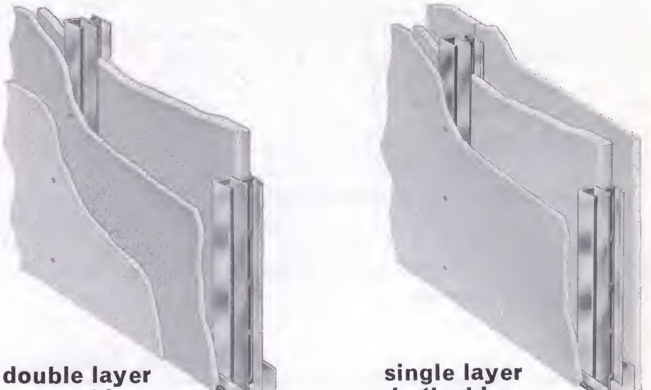
USG Cavity Shaft Walls are lightweight, non-load bearing gypsum board partition assemblies designed for erection from outside the shaft at each floor. Shafts are enclosed early in construction, the walls finished later along with interior partitions. This fast-installation feature combined with low-cost materials and high performance values, make USG Shaft Walls superior enclosures for elevator and mechanical shafts, air ducts and stairwells in multi-story buildings.

This latest improvement in gypsum shaft walls uses lower-cost studs and gypsum panels than other shaft walls. Dead load is 10% less for a partition having 2-hour fire resistance and equivalent structural strength. In addition to a 1½″ deep x 22½″ wide vertical chaseway, the C-H Stud used has 1″ dia. holes 16″ from each end for horizontal conduit runs.

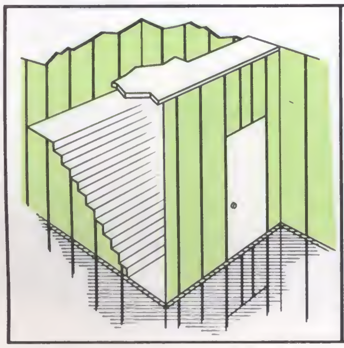
The assemblies consist of SHEETROCK FIRECODE "C" Gypsum Panels or IMPERIAL FIRECODE "C" Gypsum Base and veneer plaster, steel studs and runners, and USG Shaft Wall Liner.

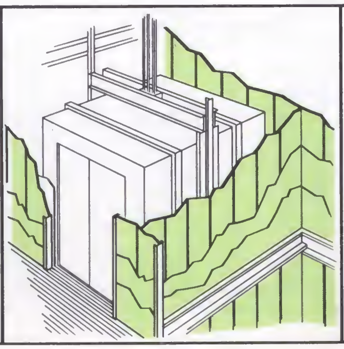
Liner panels are installed vertically between USG Steel J-Runners attached to floor and ceiling. Panel edges are inserted into specially formed USG Steel C-H Studs spaced 24″ o.c. The 2-hour shaft wall is completed with double-layer ½″ thick gypsum panels and a U.S.G. Joint System, or with gypsum base and veneer plaster applied to one side. Where both sides of the wall must be finished, single-layer panels are applied each side of studs. A 1-hour assembly is obtained with single-layer ⅝″ thick face panels. Additional layers of panels are installed to provide 3 and 4-hour fire-rated construction (see details, page 3).

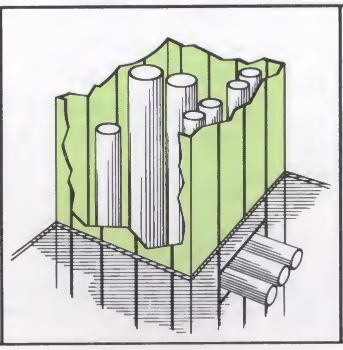
Liner panels have a special fire-resistant core and multi-layered green paper facings that are treated to resist moisture penetration. Available in lengths to 16 ft., the panels are 1″ thick, 24″ wide and have beveled edges. SHEETROCK FIRECODE "C" Panels for these systems are ½″ or ⅝″ thick and 4 ft. wide. IMPERIAL FIRECODE "C" Gypsum Base, ½″ or ⅝″ thick and 4 ft. wide, has a high-strength, high-density core covered with special-absorption face paper for a veneer finish. USG Steel J-Runners, C-H Studs and E-Studs are formed from hot-dip galvanized steel.

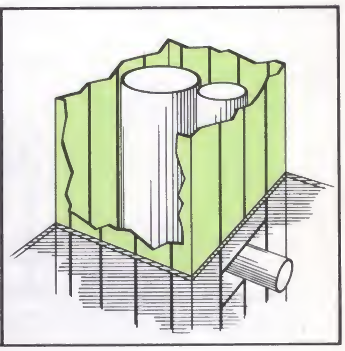

double layer one side **single layer both sides**

2-hour assemblies


stairwells


elevator shafts


mechanical shafts


air ducts

engineered performance to meet design requirements

The systems have been designed and tested using accepted engineering practices with deflection criteria of 1/120, 1/240 and 1/360 clear partition heights. A wide range of product and installation combinations is available to meet performance requirements: air pressure loading of 5, 7½, 10, 15 psf; vertical heights up to 15 ft. using 2½″ studs with greater heights available for lobbies and mechanical rooms using 4″ or 6″ studs (see Limiting Height Table, below). Up to 4-hour fire-resistance ratings and excellent sound control (see test data, page 3).

faster completion—earlier occupancy

USG Shaft Walls erect easily using components and application procedures familiar to mechanics. Cavity Shaft Walls, because they are erected without adhesives, install faster than other multi-layer gypsum panel systems. All USG Shaft Wall Systems install from each floor, leaving shaft free of scaffolding. Elevators go in months earlier than with masonry enclosures—ready to move men and materials to floors when they are needed. Jobs move faster, schedules are more easily met and buildings can be occupied sooner.

economy

USG Shaft Walls utilize low-cost materials and a minimum number of components. The assemblies are lightweight, ranging from the exceptionally low 9 psf for 2-hour systems to 16 psf for the 4-hour assembly. In high-rise buildings, where masonry shaft enclosures can weigh up to 45 psf, USG Shaft Walls offer an opportunity for significant savings in structural steel framing costs.

sound control

The standard Cavity Shaft Wall assembly offers 39 STC rating; 48 STC can be obtained by adding 1″ THERMAFIBER Sound Attenuation Blankets within the partition cavity and 51 STC with RC-1 SHEETROCK Resilient Channels and 1½″ THERMAFIBER Blankets.

USG Shaft Walls withstand air-pressure loads which high-speed elevators create. These forces have dislodged masonry units in some building shafts.

provide airtight seal

With USG Acoustical Sealant applied to partition perimeter and penetrations, the assemblies resist air pressure surges up to 15 psf (see details). This minimizes whistling and dirt accumulation due to air movement in elevator shafts.

limitations

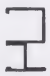
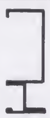
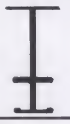
1. Non-load bearing.

2. Stud and runner thickness, stud spacing, air pressure loading and maximum flexural stress shown in the Design Data tables should not be exceeded.

3. Elevator door operating equipment should be independently mounted.

4. Exposure to excessive or continuous moisture and extreme temperatures should be avoided.

limiting heights—2 hr. fire-rated system(1)

stud type & size		designation	stud spacing	allowable deflection	air pressure load—psf			
					5	7.5	10	15
2½″ C-H Studs		212CH5	24″	1/120	14′0″(f)	11′3″(f)	10′0″(f)	8′0″(f)
				1/240	13′9″(d)	11′3″(f)	10′0″(f)	8′0″(f)
				1/360	12′0″(d)	10′6″(d)	9′6″(d)	8′0″(f)
		212CH8	24″	1/120	18′0″(f)	14′9″(f)	12′9″(f)	10′6″(f)
				1/240	15′0″(f)	13′0″(d)	11′9″(d)	10′3″(d)
				1/360	13′0″(d)	11′6″(d)	10′3″(d)	9′0″(d)
4″ C-H Studs		400CH5	24″	1/120	19′3″(f)	15′6″(f)	13′9″(f)	11′3″(f)
				1/240	16′3″(d)	14′3″(d)	13′0″(d)	11′3″(f)
				1/360	14′3″(d)	12′6″(d)	11′3″(d)	9′9″(d)
		400CH10	24″	1/120	22′9″(d)	20′0″(d)	18′3″(d)	15′9″(d)
				1/240	18′3″(d)	15′9″(d)	14′6″(d)	12′6″(d)
				1/360	15′9″(d)	13′9″(d)	12′6″(d)	11′0″(d)
double 6″ E-Studs		600ES5	24″	1/120	28′0″(v)	18′9″(v)	14′0″(v)	9′3″(v)
				1/240	26′3″(d)	18′9″(v)	14′0″(v)	9′3″(v)
				1/360	23′0″(d)	18′9″(v)	14′0″(v)	9′3″(v)
		600ES10	24″	1/120	28′0″(c)	28′0″(c)	28′0″(c)	20′0″(v)
				1/240	28′0″(c)	26′3″(d)	24′0″(d)	20′0″(v)
				1/360	26′3″(d)	23′0″(d)	21′0″(d)	18′3″(d)

(1) For assembly with double-layer board one side of studs. Limiting criteria: f—bending stress, d—deflection, v—end reaction shear, c—practical limitation. Runner attachment spacing should not exceed 24″ o.c.

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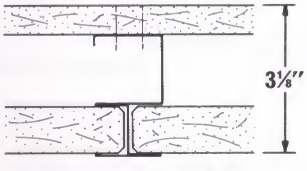
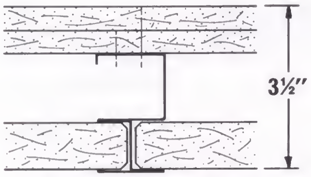
test data/components

fire rating	description	test no.		stc rating		comments
				11-f	16-f	
1 hr.	Cavity Shaft Wall Gypsum Drywall—⅝″ SHEETROCK FIRECODE "C" gypsum panels one side—1″ USG shaft wall liner panels set betw USG stl C-H studs 24″ o.c.—panels appl to side opp liner panels & screw att—joints fin wt 8 width 3⅛″	U of C 3-6-75 U of C 3-7-75	(f) (f)		N/A	Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs.	Cavity Shaft Wall Gypsum Drywall—2 layers ½″ SHEETROCK FIRECODE "C" gypsum panels one side—1″ USG shaft wall liner panels set betw USG stl C-H studs 24″ o.c.—panels appl vert to side opp liner panels & screw att—joints fin wt 9 width 3½″	U of C 3-4-75 U of C 3-5-75 BBN-750706 USG-750302	(f) (f) (s) (s)		47 39	Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface BBN-750706 based on same constr. with 1″ blankets in cavity
2 hrs.	Cavity Shaft Wall Gypsum Drywall—½″ SHEETROCK FIRECODE "C" gypsum panels—1″ USG shaft wall liner panels set betw USG stl C-H studs 24″ o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin wt 9 width 3½″	U of C 6-23-75	(f)		N/A	Construction fire-tested both sides. Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs. est	Cavity Shaft Wall Gypsum Drywall—2 layers ½″ SHEETROCK FIRECODE "C" gypsum panels one side—1″ USG shaft wall liner panels set betw USG stl C-H studs 24″ o.c.—RC-1 chan spaced 24″ o.c.—1½″ THERMAFIBER sound atten blkts—panels & RC-1 chan screw att to side opp liner panels—base layer appl horiz—face layer appl vert—joints fin wt 10 width 4″	BBN-750412	(s)		51	Estimated fire rating based on U of C 2-8-72. Rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
3 hrs. est	Cavity Shaft Wall Gypsum Drywall—3 layers ⅝″ SHEETROCK FIRECODE "C" gypsum panels one side—1″ USG shaft wall liner panels set betw USG stl C-H studs 24″ o.c.—panels screw att to side opp liner panels with joints stag—base & face layers appl vert—mid layer appl horiz—joints fin wt 12 width 4⅜″				N/A	Estimated fire rating based on U of C 2-16-72. Rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
4 hrs. est	Cavity Shaft Wall Gypsum Drywall—2 layers ⅝″ SHEETROCK FIRECODE "C" gypsum panels face side—1″ USG shaft wall liner panels set betw USG stl C-H studs 24″ o.c.—1″ liner panels & ⅝″ gypsum panel core screw att to studs—horiz USG met fur chan 24″ o.c.—face side panels screw att to fur chan—panels appl vert with joints stag—joints fin wt 16 width 6¼″				N/A	Estimated fire rating based on U of C 5-24-74. Rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface

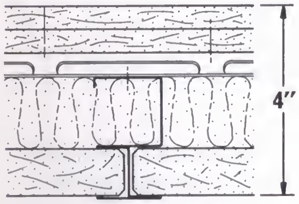
rated assemblies



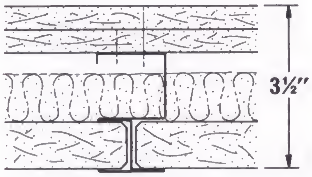
1 Hr.—U of C 3-6-75
1 Hr.—U of C 3-7-75



2 Hr.—U of C 3-4-75
2 Hr.—U of C 3-5-75
39 STC USG-750302



2 Hr. est.
51 STC—BBN-750412



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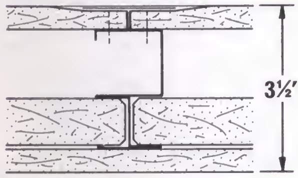
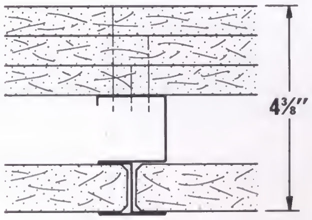
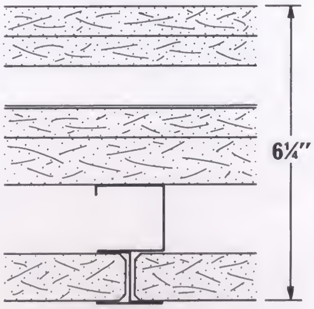
47 STC—BBN-750706



2 Hr.—U of C 6-23-75
39 STC est.



3 Hr. est.

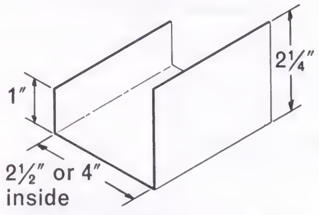


4 Hr. est.

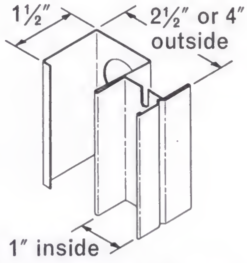
design properties—steel components

stud size	designation	avg. weight (lb/lin ft)	Ix (in⁴)	Sx* (in³)	design stress (ksi)	end reaction (lb)
2½″	212CH5	.604	.146	.135	16.30	205
	212CH8	.862	.208	.185	19.96	422
4″	400CH5	.716	.433	.258	16.30	173
	400CH10	1.243	.730	.431	21.20	282
double 6″ E-Stud	600ES5	1.546	2.004	.628	20.00	140
	600ES10	2.372	3.400	1.094	20.00	300

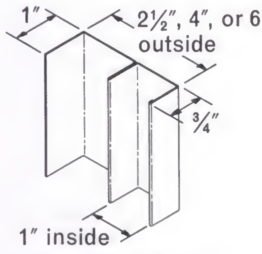
*Full section modulus to be used with corresponding design stress. For wind loads, design stress shown can be increased 33⅓%.



USG steel J-runner



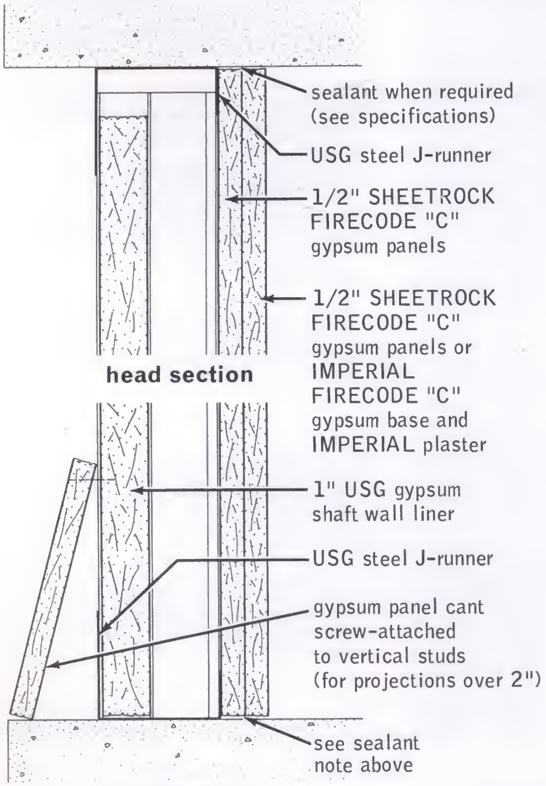
USG steel C-H stud



USG steel E-stud

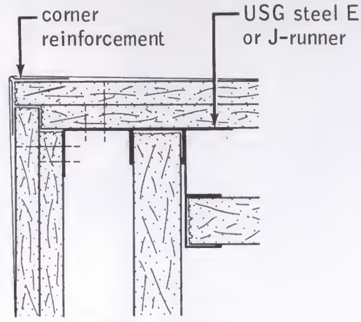
details

scale: 1½" & 3"=1'-0"

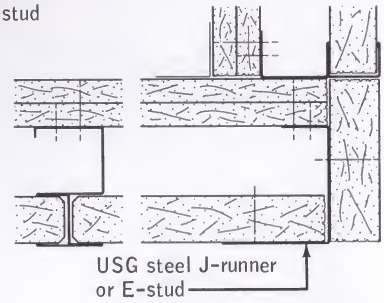

sealant when required
(see specifications)
USG steel J-runner
1/2" SHEETROCK FIRECODE "C" gypsum panels
1/2" SHEETROCK FIRECODE "C" gypsum panels or IMPERIAL FIRECODE "C" gypsum base and IMPERIAL plaster
1" USG gypsum shaft wall liner
USG steel J-runner
gypsum panel cant screw-attached to vertical studs (for projections over 2")
see sealant note above

head section

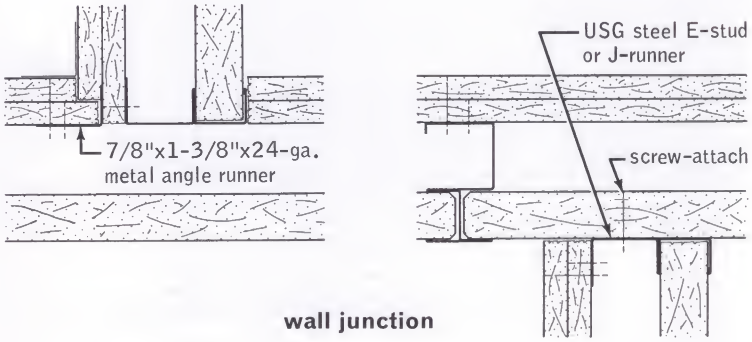
base section



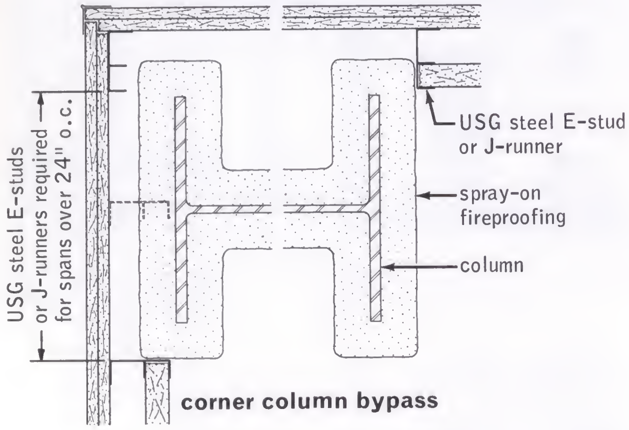
outside corner



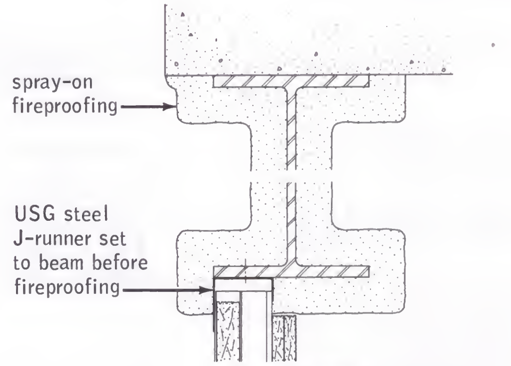
inside corner


7/8"x1-3/8"x24-ga. metal angle runner
USG steel E-stud or J-runner
screw-attach

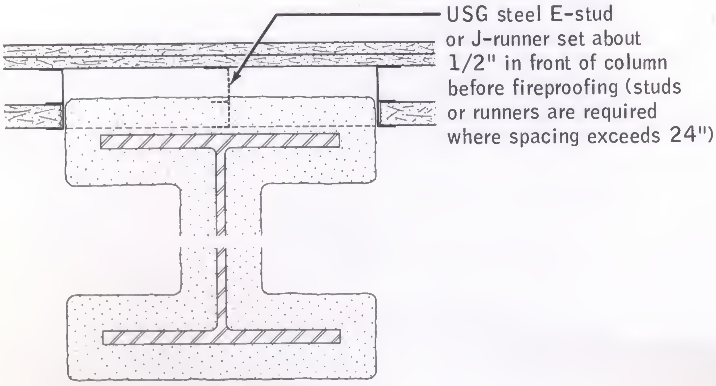
wall junction


USG steel E-studs or J-runners required for spans over 24" o.c.
USG steel E-stud or J-runner
spray-on fireproofing
column

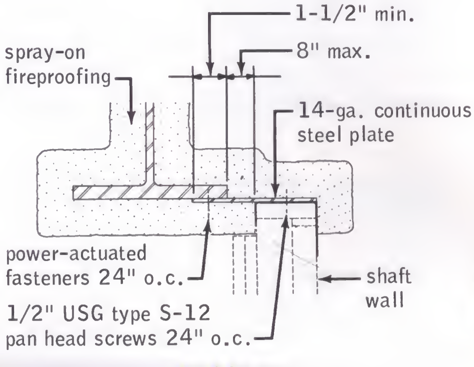
corner column bypass



steel beam


USG steel E-stud or J-runner set about 1/2" in front of column before fireproofing (studs or runners are required where spacing exceeds 24")

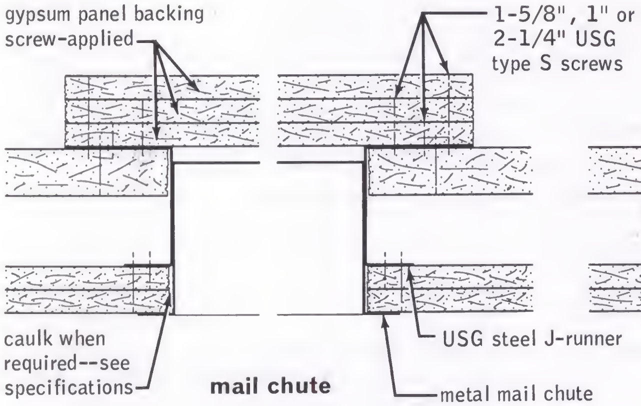
column bypass


1-1/2" min.
8" max.
spray-on fireproofing
14-ga. continuous steel plate
power-actuated fasteners 24" o.c.
shaft wall
1/2" USG type S-12 pan head screws 24" o.c.

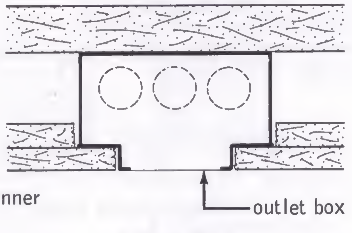
steel beam
offset wall

details

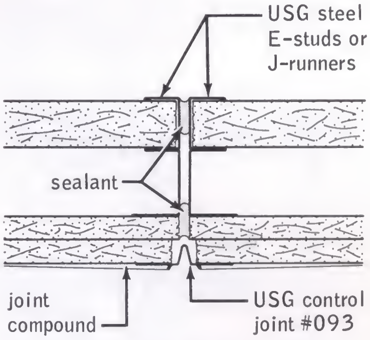
scale: 3″ = 1′-0″


gypsum panel backing screw-applied
1-5/8", 1" or 2-1/4" USG type S screws
caulk when required--see specifications
USG steel J-runner
metal mail chute

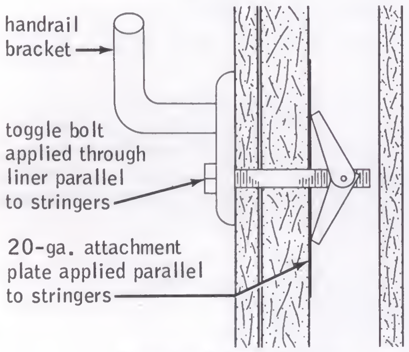
mail chute



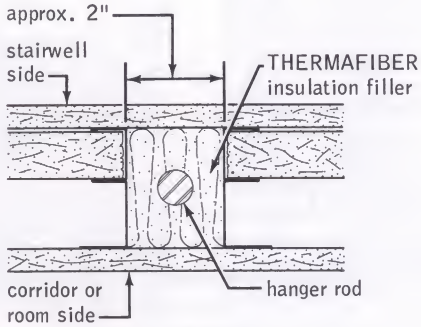
outlet box



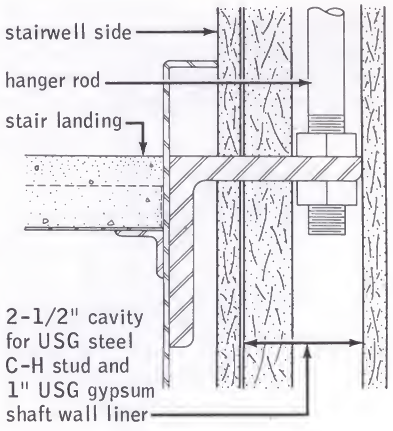
control joint


handrail bracket
toggle bolt applied through liner parallel to stringers
20-ga. attachment plate applied parallel to stringers

handrail application

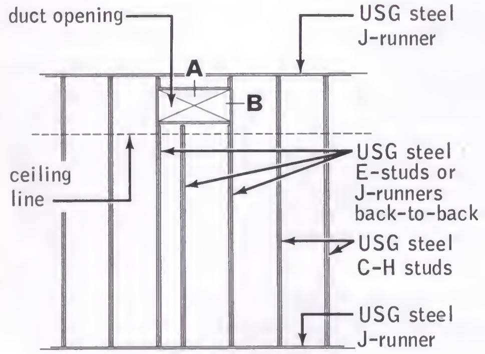


cross section at stair hanger

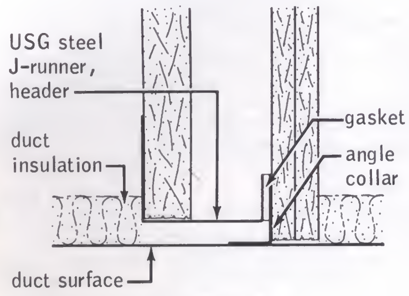

stairwell side
hanger rod
stair landing
2-1/2" cavity for USG steel C-H stud and 1" USG gypsum shaft wall liner

stair hanger rod application

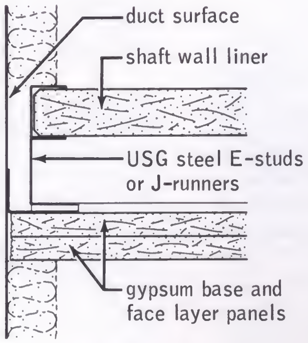
typical penetrations



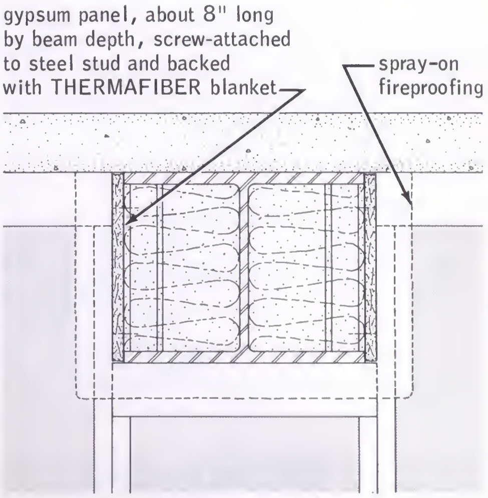
elevation at duct opening



section—A


duct surface
shaft wall liner
USG steel E-studs or J-runners
gypsum base and face layer panels

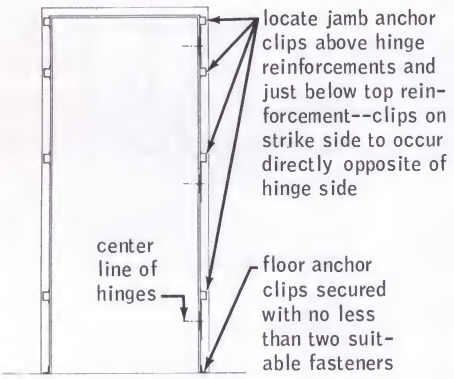
section—B


gypsum panel, about 8" long by beam depth, screw-attached to steel stud and backed with THERMAFIBER blanket
spray-on fireproofing

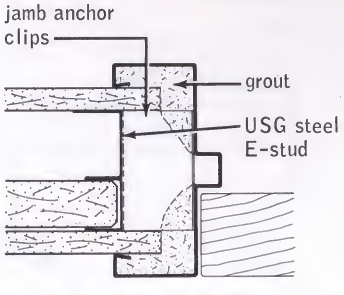
elevation at boxed beam

details

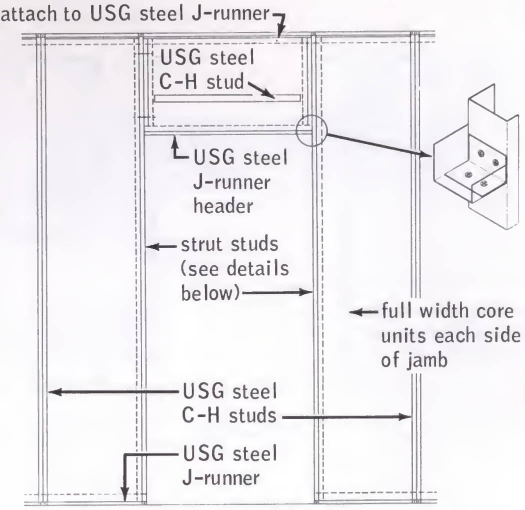
typical elevations


locate jamb anchor clips above hinge reinforcements and just below top reinforcement--clips on strike side to occur directly opposite of hinge side
center line of hinges
floor anchor clips secured with no less than two suitable fasteners

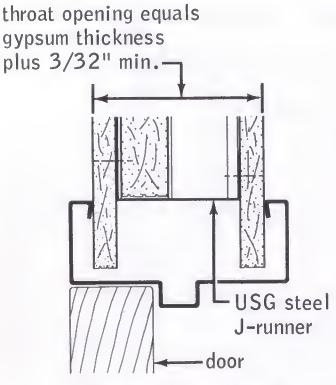
cross section thru frames



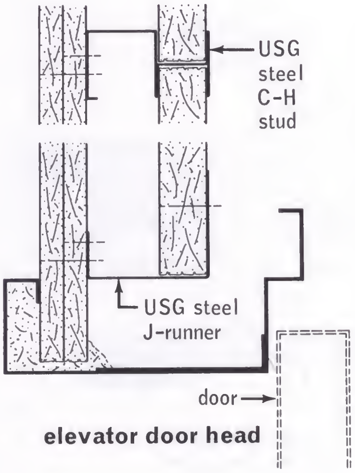
hinged door jamb


screw-attach to USG steel J-runner
USG steel C-H stud
USG steel J-runner header
strut studs (see details below)
full width core units each side of jamb
USG steel C-H studs
USG steel J-runner

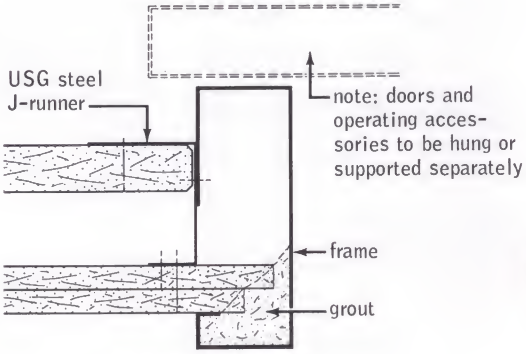
rough door opening



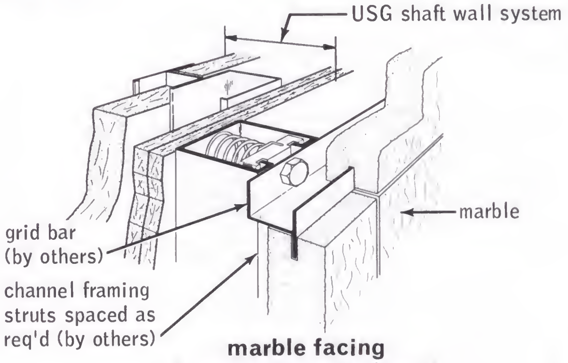
hinged door head



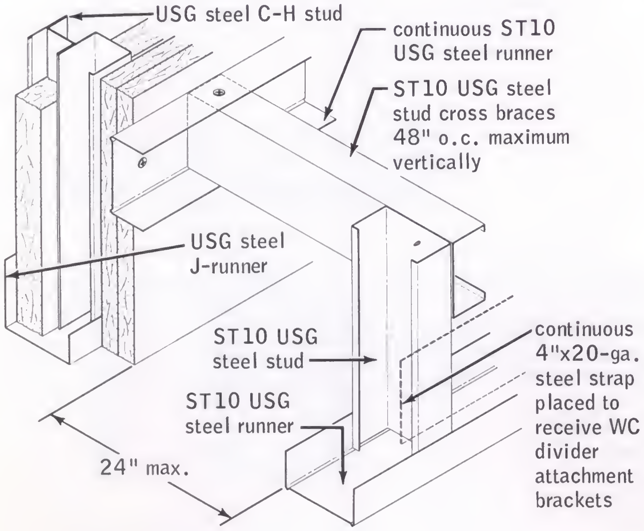
elevator door head


USG steel J-runner
note: doors and operating accessories to be hung or supported separately
frame
grout

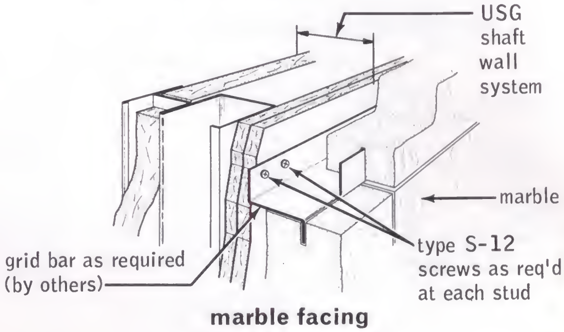
elevator door jamb



marble facing
free-standing attachment


USG steel C-H stud
continuous ST10 USG steel runner
ST10 USG steel stud cross braces 48" o.c. maximum vertically
USG steel J-runner
ST10 USG steel stud
ST10 USG steel runner
24" max.
continuous 4"x20-ga. steel strap placed to receive WC divider attachment brackets

steel stud chase wall


USG shaft wall system
marble
type S-12 screws as req'd at each stud
grid bar as required (by others)

marble facing
direct attachment

specifications—notes to architect

1. *U.S.G. will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on U.S.G. products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.*

2. *Shaft wall surfaces should be isolated with control joints or other means where:* **(a)** *construction changes within the plane of the shaft wall;* **(b)** *shaft wall run exceeds 50′. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.*

3. *Penetrations of the diaphragm, such as door frames and duct openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used. Penetrations greater than 48″ wide require supplemental support for the shaft wall at the opening.*

4. *Where access panels or large duct penetrations occur in shafts having pressure loads, headers, sills and adjacent channels may require reinforcing to properly distribute these loads.*

5. *Where shaft walls enclose elevator and return air vents, and intermittent pressures up to 15 psf are expected, sealant is recommended at intersections with floors, ceilings, columns, ducts, etc. to seal peripheries and penetrations and minimize whistling and dirt accumulation due to air movement. Sustained pressures require special details to seal the wall.*

6. *USG Brand Type S Screws are suitable for gypsum panel or gypsum base attachment to styles 5 and 10 steel studs. Type S-12 Screws should be specified for other applications to steel heavier than 20-ga. Screw length should be 1″ for base layer and 1⅝″ for face layer and at least ⅜″ longer than the total thickness for other applications.*

7. *In steel frame construction, runners and studs attached to beams and columns should be installed before steel is spray-fireproofed. Excess fireproofing should be removed from runners and studs before installing shaft wall liner or laminated coreboard and sealant.*

8. Deflection—*Selection of limiting heights should be based on allowable deflection as follows:* **(a)** *1/240 for gypsum panel surfaces, veneer plaster surfaces, and areas to receive adhesively applied ceramic tile;* **(b)** *mechanically attached marble or heavy stone should support its own weight from the floor or be separately supported. While some building codes permit design using 1/120 deflection and 5 psf uniform load, this large deflection may cause failure of screws attaching gypsum panels to steel components.*

9. *Metal door frames should be at least 16-ga. steel, shop primed, and have throats accurately formed to overall thickness of the shaft wall plus 3⁄32″ minimum. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchor clips should be 18-ga. steel welded in jamb (see details, page 6), and screw-attached to studs.*

All one-piece frames should be grouted after shaft wall liner is installed. Apply DURABOND or USG Ready-Mixed Joint Compound just before inserting face layer into frame. Do not terminate panels against trim return. Provide additional bracing where required by installing diagonal bracing from jamb strut-studs to structure.

10. *Where Cavity Shaft Wall height exceeds max. available panel height, liner panel end joints should be positioned within the upper and lower third-points of wall and studs be screw-attached to runners. Also, joints in adjacent panels should be staggered top and bottom to prevent a continuous horizontal joint.*

11. *See U.S.G. Product Folders in this series: Gypsum Panels Folder SA-927 for shaft wall components and joint system specifications; Gypsum Plasters, Bases & Accessories Folder SA-917 for lath and plaster specifications; Paint Products Folder SA-933 for paint specifications. See USG Shaft Wall Manual CS-8 for installation directions.*

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

a. In cold weather during gypsum panel joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

b. When low humidity, high temperatures and rapid drying conditions exist during gypsum base and plaster application, Durabond Joint Compound and Perf-A-Tape Reinforcement shall be used on all joints and internal corners and allowed to set and dry thoroughly before plaster application.

1.5 protection

All materials shall be suitably protected from the weather during installation to prevent damage to the shaft wall.

Part 2: products

2.1 materials

a. Liner Board—1″ USG Gypsum Shaft Wall Liner, beveled edge, 24″ wide, lengths as required.

b. Faceboards—(½″) (⅝″) thick, 48″ wide, Sheetrock Firecode "C" Gypsum Panels, lengths as required.

c. Gypsum Base—(½″) (⅝″) thick, 48″ wide, square-edge Imperial Firecode "C" Gypsum Base, lengths as required.

d. Joint Treatment—(select a U.S.G. Joint System).

e. Imperial Tape—(Type P) (Type S) for gypsum base.

f. Fasteners—USG Brand Screws; ⅜″ Type (S) (S-12) pan head; (1″) (1⅝″) (2¼″) Type S bugle head.

g. USG Metal Trim—No. (200A) (200B) (401) (402) (701B) (801B).

h. USG Corner Bead—(Dur-A-Bead) (No. 800) (No. 900).

i. USG Control Joint No. 093.

j. USG Metal Furring Channel.

k. RC-1 Sheetrock Resilient Channels.

l. USG Steel C-H Studs, (212CH5) (212CH8) (400CH5). (400CH10) hot-dipped galvanized, lengths as required (select from tables).

m. USG Steel E-Studs (212ES5) (212ES10) (400ES5) (400ES10). (600ES5) (600ES10) hot-dipped galvanized, lengths as required (select from tables).

n. USG Steel J-Runners, (212JR7) (400JR7) (600JR7) hot-dipped galvanized, lengths as required (select from tables).

o. Runner Fasteners, power-driven type, to withstand 193 lb. single shear and 200 lb. bearing force when driven through structural head or base and without exceeding allowable design stress in runner, fastener or structural support (not available from U.S.G.).

p. USG Acoustical Sealant.

Part 3: execution

3.1 cavity shaft wall erection

Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and 24″ o.c. With steel frame construction, install floor and ceiling runners and J-Runners or E-Studs on columns before steel is fireproofed. Remove spray-fireproofing from runners and E-Studs before installing shaft wall liner.

Cut liner board panels 1″ less than floor-to-ceiling height and erect vertically between J-Runners. Where shaft walls exceed max. available panel height, position liner panel end joints within upper and lower third points of wall. Stagger joints top and bottom in adjacent panels.

Use steel C-H-studs ⅜″ to not more than ½″ less than floor-to-ceiling height, and install between liner panels with liner inserted in the groove. Install full-length steel E-Studs or J-Runners vertically at T-intersections, corners, door jambs, and columns. Install full-length E-Studs over shaft wall liner both sides of closure panels. Frame openings cut within a liner panel with J-Runner around perimeter. For openings, frame with vertical E-Stud or J-Runner at edges, horizontal J-Runner at head and sill, and reinforcing as shown on the drawings. Suitably frame all openings to maintain structural support for wall.

Install floor-to-ceiling steel E-Studs each side of steel hinged door frames and J-Runners or E-Studs each side of elevator door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with two ⅜″ Type S-12 Pan Head Screws. Over metal doors, install a cut-to-length section of J-Runner and attach to strut-studs with clip angles and ⅜″ Type S-12 Screws.

Install RC-1 Resilient Channels horizontally to face of studs, within 6″ of floor and ceiling and max. 24″ o.c. Attach channels to studs with ⅜″ Type S-12 Screws driven through holes in mounting flange. Extend channels into all corners and attach to corner framing. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice. Install ½″ x 3″ wide continuous gypsum filler strips to top and bottom runner.

For resiliently attached finish, apply base layer horizontally to resilient channels with end joints staggered; fasten with 1″ Type S Screws 12″ o.c. Apply face layer vertically with joints staggered and attach to channels with 1⅝″ Type S Screws 12″ o.c.

For double-layer finish, erect ½″ SHEETROCK FIRECODE "C" Gypsum Panel base layer horizontally one side of studs with end joints staggered. Fasten base layer panels to studs with 1″ Type S Screws 24″ o.c. Caulk perimeter of base layer panels. Apply ½″ SHEETROCK FIRECODE "C" Gypsum Panel face layer vertically over base layer with joints staggered and attached with 1⅝″ Type S Screws staggered from those in base, spaced 12″ o.c. and driven into studs.

Where both sides of shaft wall are finished, apply ½″ SHEETROCK FIRECODE "C" Gypsum Panel face layers vertically both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1″ Type S Screws spaced 12″ o.c. in field and along edges.

For triple-layer finish, erect base layer vertically one side of studs, mid layer horizontally with joints staggered and face layer vertically with joints staggered. Attach gypsum panels to studs with 1″ Type S Screws 24″ o.c. for base layer, 1⅝″ Type S Screws 24″ o.c. for mid layer and 2¼″ Type S Screws16″ o.c. for face layer. Attach face panels to J-Runners with 2¼″ Type S Screws 12″ o.c.

Note—For 4-hr. assembly, erect steel runners, steel studs and liner panels as described in first four paragraphs, then continue construction as described below:

Position second layer liner panels vertically over studs and fasten to studs with 1⅝″ Type S Screws spaced 6″ from top and bottom and 24″ o.c. Apply ⅝″ SHEETROCK FIRECODE "C" Gypsum Panel layer vertically over liner panels and attach with 2¼″ Type S Screws staggered from screws in liner panel layer, spaced 24″ o.c. and driven into studs.

Install USG Metal Furring Channels horizontally over gypsum panel layer at ceiling and spaced 24″ o.c. vertically. Fasten top channel to studs and runner with 2¼″ Type S Screws spaced 12″ o.c. and alternated on channel flanges. Fasten other channels to studs with screws spaced 24″ o.c. in top channel flange.

Install second layer ⅝″ SHEETROCK FIRECODE "C" Gypsum Panels vertically over furring channels with vertical joints staggered 24″ from joints in first layer. Fasten panels to channels with 1″ Type S Screws spaced 1″ from vertical edges, 12″ o.c. in top channel and 24″ o.c. in other channels. Install face layer panels vertically over second layer with vertical joints staggered 24″. Fasten panels to furring channels with 1⅝″ Type S Screws located ¾″ and 6″ from edges and spaced 12″ o.c. in between.

3.2 accessory application

a. Gypsum Panel Joints—Finish all face layer joints and internal angles with a U.S.G. Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

b. Gypsum Base Joints—Apply IMPERIAL Tape over full length of all gypsum base joints; do not overlap at intersections. Firmly press Type P Tape to insure firm wrinkle-free attachment. Fasten Type S Tape with ⅜″ staples; use two staples at each tape end and stagger intermediate staples 24″along length; at internal corners, staple tape 24″ o.c. to ceiling or one side only. When rapid drying conditions exist, use DURABOND Joint System installed according to manufacturer's directions.

c. Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with staples 12″ o.c. on both flanges along entire length of bead.

d. Metal Trim—Where shaft wall terminates against masonry or other dissimilar material, apply metal trim over face layer edge and fasten with screws or staples spaced 12″ o.c.

e. Screws—Power-drive at least ⅜″ from edges or ends of gypsum panels to provide uniform dimple 1/32″ deep. In gypsum base, set flush with surface without tearing face paper.

f. Control Joints—Break face layer behind joint. Attach control joint to face layer with staples spaced 6″ o.c. on both flanges along entire length of joint.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE, PERF-A-TAPE, DURABOND, DUR-A-BEAD, THERMAFIBER, IMPERIAL.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

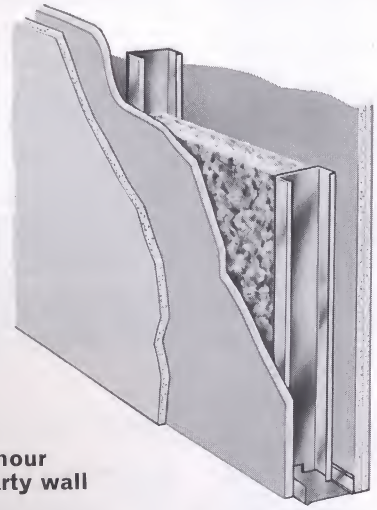
partitions/ceilings **SA**

USG Steel-Framed Drywall Systems 923

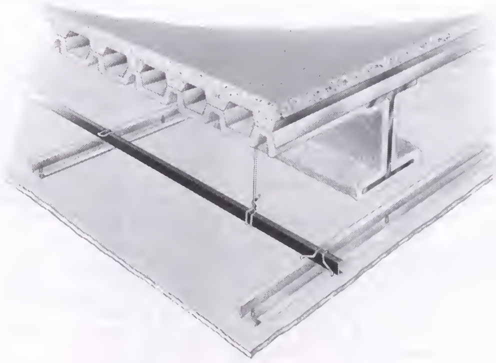
system folder

9.5/Ud

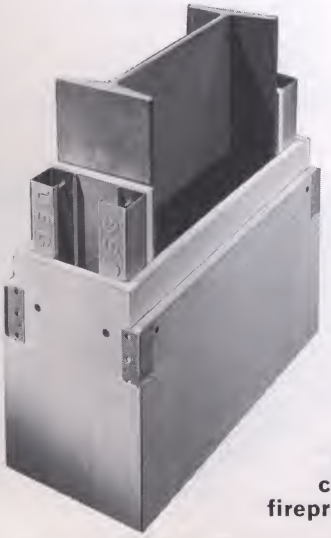
lightweight, fire and sound-resistant assemblies for partitions, ceilings, column fireproofing, wall furring



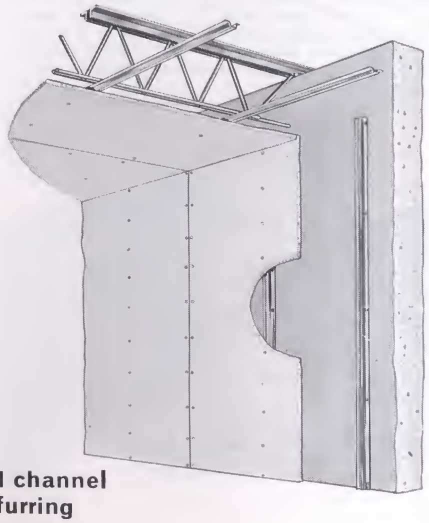
2-hour
party wall



2-hour
floor/ceiling



2-hour
column
fireproofing

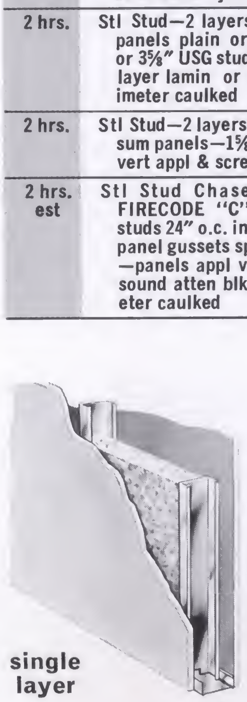


metal channel
wall furring

UNITED STATES GYPSUM
1977—1
9P
GYPSUM DRYWALL
systems—steel frame

partitions/test data

fire rating	description	test no.	stc rating		comments
			11-f	16-f	
1 hr.	Stl Stud—½″ SHEETROCK FIRECODE "C" gypsum panels—2½″ USG studs 24″ o.c.—single layer panels ea side appl vert & screw att—1½″ THERMAFIBER sound atten blkts one side—joints fin—perimeter caulked wt 5 width 3½″	T-3362-OSU (f) TL-69-42 (s) TL-65-158 (s)		45 47	TL-65-158 based on 3⅝″ studs & 1″ blkts.
1 hr. est	Stl Stud—⅝″ SHEETROCK FIRECODE gypsum panels—2½″ USG studs 24″ o.c.—1½″ THERMAFIBER sound atten blkts—2 layer—base layer ¼″ SHEETROCK panels screw att—⅝″ face layer screw att—joints fin—perimeter caulked wt 7 width 4¼″	CK-684-14 (s) CK-684-13 (s)		55 53	Est. fire rating based on T-1174-OSU CK-684-13 based on ½″ thick panels
1 hr. est	Stl Stud—½″ SHEETROCK FIRECODE "C" gypsum panels—2½″ USG studs 24″ o.c.—single layer panels one side appl vert & screw att—1½″ THERMAFIBER sound atten blkts one side—2 layers opp side—panels appl vert & screw att—joints stag & fin—perimeter caulked wt 7 width 4″	BBN-760401 (s) TL-69-153 (s) TL-69-148 (s) BBN-700726 (s)		50 49 41 51	Est. fire rating based on T-3362-OSU BBN-760401 based on 2″ blankets TL-69-148 based on same construction without blankets BBN-700726 based on 2⅝″ foil-faced blkts.
1 hr. est	Stl Stud—⅝″ SHEETROCK FIRECODE "C" gypsum panels—3⅝″ USG studs 24″ o.c.—single layer panels one side appl vert & screw att—2″ THERMAFIBER sound atten blkts one side—2 layers opp side—panels appl vert & screw att—joints stag & fin—perimeter caulked wt 8 width 5½″	USG-241-ST-G&H (s)		50	Est. fire rating based on T-3362-OSU
1 hr.	Stl Stud—2 layers ½″ SHEETROCK gypsum panels ea side—1⅝″ USG studs 24″ o.c.—panels appl vert & screw att—joints stag & fin—perimeter caulked wt 9 width 3⅝″	U of C 9-21-64 (f) CK-654-40 (s)		53	Sound test based on 2½″ studs & 1½″ blankets
1 hr.	Stl Stud—⅝″ SHEETROCK FIRECODE gypsum panels—3⅝″ USG studs 24″ o.c.—single layer panels vert or horiz appl & screw att 12″ o.c.—joints fin—perimeter caulked wt 6 width 4⅞″	T-1174-OSU (f) GA-WP-45-1 hr (f) USG-17-FT-G&H (s)	42		Basic 1-hr. corridor—fire tests based on screws 8″o.c. at vert. joints—WP-45 based on horizontal application
1 hr.	Stl Stud—⅝″ SHEETROCK FIRECODE gypsum panels—1⅝″ USG studs 24″ o.c.—single layer panels vert appl & screw att 12″ o.c.—joints fin—perimeter caulked wt 5 width 2⅞″	U of C 7-31-62 (f) TL-64-29 (s)	38		Min. 1-hr. drywall partn.—fire test based on screws 8″ o.c. at vert. joints
1 hr. est	Stl Stud—½″ SHEETROCK FIRECODE "C" gypsum panels—3″ USG studs 24″ o.c.—single layer panels vert appl & screw att—1½″THERMAFIBER sound atten blkts—joints fin—perimeter caulked wt 5 width 4″	BBN-710310 (s) BBN-710305 (s)		45 39	Est. fire rating based on T-3362-OSU BBN-710305 based on same construction without blankets
2 hrs.	Stl Stud—2 layers ½″ SHEETROCK FIRECODE "C" gypsum panels ea side—2½″ or 3⅝″ USG studs 24″ o.c.—1″, 1½″ or 2″ THERMAFIBER sound atten blkts stapled—panels appl vert & joints stag—base layer screw att—face layer strip lamin or screw att—joints fin—perimeter caulked wt 10 width 4½″	UL Des U412 (f) (was 28-2 hr) Field Test KSO-109006-a (s) USG-114-FT-G&H (s) CK-654-40 (s)	55 54	54 53	Best value of drywall steel stud party walls in 50-54 stc range. Fire rating based on assembly with or without sound atten. blkts. CK-654-40 based on screw-attached face layer
2 hrs. est	Stl Stud—2 layers ½″ SHEETROCK FIRECODE "C" gypsum panels ea side—2″ USG studs 24″ o.c.—panels appl vert & screw att—1½″ THERMAFIBER sound atten blkts—joints fin—perim caulked wt 9 width 4″	TL-69-159 (s) TL-69-155 (s)		52 45	Est. fire rating based on UL Des U412 TL-69-155 based on same construction without blankets
2 hrs.	Stl Stud—2 layers ⅝″ SHEETROCK FIRECODE gypsum panels plain or vinyl faced vert appl ea side—2½″ or 3⅝″ USG studs 24″ o.c.—base layer screw att—face layer lamin or screw att—joints fin or unfin—perimeter caulked wt 12 width 6⅛″	UL Des U411 (f) (was 11-2 hr) TL-60-113 (s)	46		Excellent for corridors
2 hrs.	Stl Stud—2 layers ½″ SHEETROCK FIRECODE "C" gypsum panels—1⅝″ USG studs 24″ o.c.—2 layers ea side vert appl & screw att joints fin wt 9 width 3⅝″	U of C 6-15-65 (f)	N/A		Most economical 2-hour steel stud drywall partition
2 hrs. est	Stl Stud Chase Wall—2 layers ½″ SHEETROCK FIRECODE "C" gypsum panels ea side—1⅝″ USG studs 24″ o.c. in 2 rows spaced 5¾″ apart—½″ gypsum panel gussets spanning chase att to studs at qtr points—panels appl vert & screw att—1½″ THERMAFIBER sound atten blkts one side—joints stag & fin—perimeter caulked wt 11 width 12″	USG-134-FT-G&H (s)	55		Est. fire rating based on UL Des U412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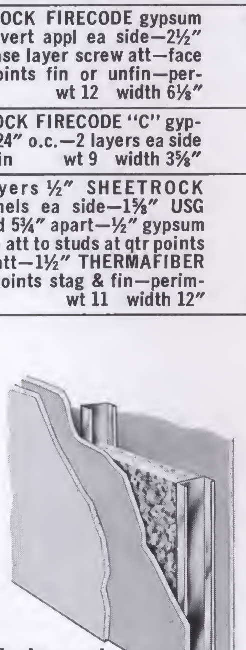
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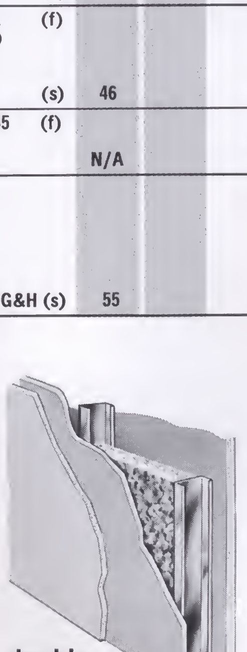
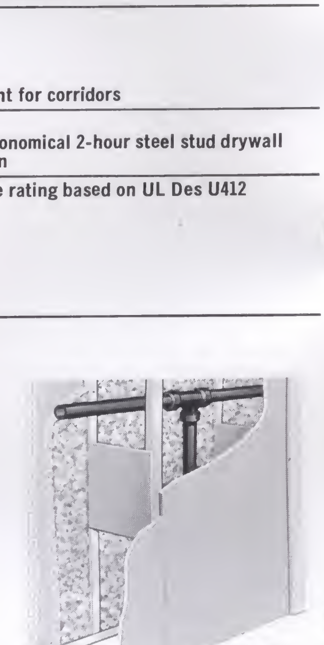

double layers


chase wall

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partitions

description

These lightweight, fire and sound-resistant assemblies consist of one or two layers of Sheetrock Gypsum Panels screw-attached to steel framing. A specially designed self-tapping steel screw with a rust-inhibitive coating is used to attach the panels to the framing. The systems are completed with a U.S.G. joint system and decorating—both steps unnecessary in walls when predecorated vinyl-surfaced Textone Gypsum Panels are used.

Gypsum panels for these assemblies are available in three thicknesses and seven types (see Specifications). Sheetrock Firecode and Firecode "C" Gypsum Panels, with a specially formulated core, obtain higher fire ratings than regular Sheetrock Panels (see table, page 2). These versatile panels are applied to USG Steel Studs or Metal Furring Channels to meet design requirements for fixed interior partitions—divider, corridor, party and chase walls; furred and suspended ceilings; wall furring and column fireproofing, as outlined below:

1. Partitions—Single layer of ½″ or ⅝″ thick Sheetrock Firecode "C" Gypsum Panels applied to USG Steel Studs, set in runners, provides economical 1-hour fire-rated partitioning for corridors or within units. The studs are available in eight widths and three types (see Specifications, page 16) and lengths to suit job requirements. With double-layer ½″ Sheetrock Firecode "C" Gypsum Panels attached to 2½″ or 3⅝″ studs spaced 24″ o.c., a 2-hour fire rating plus sound control suitable for party walls is available. Where added partition width is required, double rows of studs are erected to provide chase walls with up to 20¾″ net pipe chase width (see page 7).

Shaft Walls—Sheetrock Panels, assembled with gypsum shaft wall liner and specially shaped C-H Studs, offer systems ideally suited for enclosing elevator shafts, stairwells and other vertical shafts in core areas of multi-story buildings (see separate Shaft Wall Folder SA-922 for applications).

2. Ceilings—Single-layer ⅝″ Sheetrock Firecode "C" Panels screw-attached to furred or suspended USG Metal Furring Channels 24″ o.c. provide a 3-hour fire rating including beam protection (see page 16). The systems are also suitable for separate beam protection and for exterior ceilings and soffits with USG Exterior Gypsum Ceiling Board facings.

3. Wall Furring—With Foil-Back Sheetrock Panels screwed to USG Metal Furring Channels, this construction provides an excellent vapor barrier and offers significant insulating value as exterior wall furring (see page 10). Sheetrock Panel application to USG Z-Furring Channels with semi-rigid insulation provides a fully insulated wall at a cost competitive with many non-insulated furred walls (see page 11).

4. Column Fireproofing—Sheetrock Firecode "C" Gypsum panels screw-attached to steel studs at column corners and finished with corner bead and joint compound, offer lightweight, compact fire protection for steel columns (see page 9).

function and utility

Adaptable to virtually every type of new construction—commercial, institutional, industrial and residential—or in modernization to provide smooth, durable interior surfaces.

Fire Resistant—Constructed of noncombustible components. Established fire ratings available to meet design requirements; partitions up to 2 hours, ceilings up to 3 hours including beam, column fireproofing up to 4 hours.

Sound Isolation—STC ratings up to 55 for double-layer and 48 for single-layer partitions; 54 for single-layer ceilings. Thermafiber Sound Attenuation Blankets are used where greater sound isolation is desired.

Lightweight—These thin drywall assemblies weigh only 5 to 12 psf, reduce dead load and save floor area.

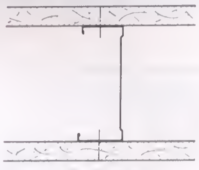
Economical—Low material cost and speed of erection provide realistic and competitive construction costs.

limitations

1. Non-load bearing.
2. These assemblies should not be used where exposed to excessive moisture or humidity.
3. Maximum frame spacing is 24″ o.c.
4. In ceiling design, certain precautions concerning construction, isolation and ventilation are necessary for good performance (see Specifications, page 16).

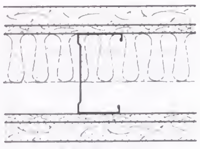
sound-tested assemblies

single layer

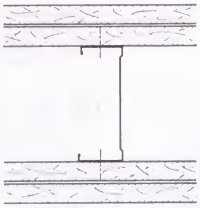


42 STC
USG-17-FT G&H

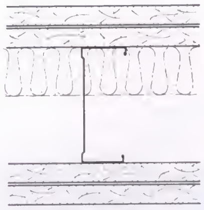
double layer



55 STC
CK-684-14

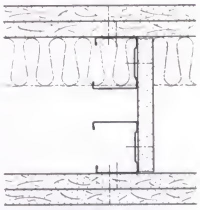


46 STC
TL-60-113

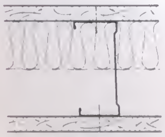


54 STC
KSO-109006-a

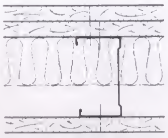
chase wall



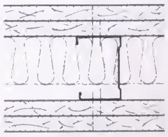
55 STC
USG-134-FT G&H



45 STC
BBN-710310



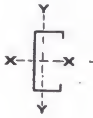
49 STC
TL-69-153



52 STC
TL-69-159

technical data

structural properties



stud style	I in.^{4}x-x	S in.^{3}x-x	R in.x-x
158ST5	0.043	0.047	0.689
20ST5	0.069	0.062	0.837
212ST5	0.115	0.082	1.028
30ST5	0.174	0.105	1.213
358ST5	0.269	0.135	1.588
40ST5	0.338	0.154	1.583
60ST5	0.324	0.146	1.648
20ST10	0.126	0.123	0.820
212ST10	0.210	0.164	1.012
30ST10	0.320	0.209	1.197
358ST10	0.497	0.269	1.422
40ST10	0.626	0.307	1.553
60ST10	0.864	0.396	2.076
35ST8	0.422	0.242	1.395
35ST10	0.506	0.291	1.391

limiting height—chase wall partitions

stud style	stud width	stud spacing	allow. defl.	one layer	two layers
158ST5	1⅝″	16″	1/120 1/240	15′9″f 13′3″d	15′9″f 14′0″d
		24″	1/120 1/240	13′0″f 11′6″d	13′0″f 12′3″d
212ST5	2½″	16″	1/120 1/240	21′0″f 17′6″f	21′0″f 20′3″d
		24″	1/120 1/240	17′0″f 15′3″d	17′0″f 17′0″f
358ST5	3⅝″	16″	1/120 1/240	26′9″f 22′6″d	26′9″f 25′9″d
		24″	1/120 1/240	22′0″f 19′6″d	22′0″f 22′0″f

Limiting height for ½″ or ⅝″ thick panels and 5 psf uniform load perpendicular to partition. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

limiting height—steel stud assemblies

stud style	stud width	stud spacing	allow. defl.	partition, one layer	partition, two layers	furring, one layer
USG Steel Studs (ST5)						
158ST5	1⅝″	16″	1/120 1/240	11′3″f 10′0″d	11′3″f 11′3″f	10′0″f 8′6″d
		24″	1/120 1/240	9′3″f 8′9″d	9′3″f 9′3″f	8′3″f 7′6″d
20ST5	2″	16″	1/120 1/240	12′9″f 11′3″d	12′9″f 12′6″d	11′3″f 10′0″d
		24″	1/120 1/240	10′6″f 10′0″d	10′6″f 10′6″f	9′3″f 8′9″d
212ST5	2½″	16″	1/120 1/240	14′9″f 13′0″d	14′9″f 14′3″d	12′6″f 11′6″d
		24″	1/120 1/240	12′0″f 11′6″d	12′0″f 12′0″f	10′3″f 10′0″d
30ST5	3″	16″	1/120 1/240	16′9″f 14′9″d	16′9″f 16′0″d	13′9″f 13′3″d
		24″	1/120 1/240	13′9″f 13′0″d	13′9″f 13′9″f	11′3″f 11′3″f
358ST5	3⅝″	16″	1/120 1/240	19′0″f 16′9″d	19′0″f 18′0″d	15′3″f 15′3″d
		24″	1/120 1/240	15′6″f 14′9″d	15′6″f 15′6″f	12′6″f 12′6″f
40ST5	4″	16″	1/120 1/240	20′3″f 18′0″d	20′3″f 19′3″d	16′3″f 16′3″f
		24″	1/120 1/240	16′6″f 15′9″d	16′6″f 16′6″f	13′3″f 13′3″f
60ST5	6″	16″	1/120 1/240	19′9″f 19′9″f	19′9″f 19′9″f	15′0″f 15′0″f
		24″	1/120 1/240	16′0″f 16′0″f	16′0″f 16′0″f	12′3″f 12′3″f

stud style	stud width	stud spacing	allow. defl.	partition, one layer	partition, two layers	furring, one layer
USG Steel Studs (ST10)						
20ST10	2″	16″	1/120 1/240	16′0″d 12′9″d	17′3″d 13′9″d	14′9″d 11′9″d
		24″	1/120 1/240	14′0″d 11′0″d	14′9″f 12′0″d	12′9″d 10′3″d
212ST10	2½″	16″	1/120 1/240	17′6″d 13′9″d	19′9″d 15′9″d	17′3″d 13′9″d
		24″	1/120 1/240	15′3″d 12′0″d	17′0″f 13′9″d	14′6″f 12′0″d
30ST10	3″	16″	1/120 1/240	21′0″d 16′9″d	22′3″d 17′9″d	19′9″d 15′9″d
		24″	1/120 1/240	18′6″d 14′6″d	19′3″f 15′6″d	17′3″d 13′9″d
358ST10	3⅝″	16″	1/120 1/240	23′0″d 18′3″d	25′3″d 20′0″d	21′9″f 18′0″d
		24″	1/120 1/240	20′0″d 16′0″d	21′9″f 17′6″d	17′9″f 15′9″d
40ST10	4″	16″	1/120 1/240	24′9″d 19′6″d	27′0″d 21′6″d	24′9″f 21′6″d
		24″	1/120 1/240	21′6″d 17′0″d	23′3″f 18′9″d	20′3″f 18′9″d
60ST10	6″	16″	1/120 1/240	27′6″d 21′9″d	32′0″d 25′6″d	24′9″f 21′6″d
		24″	1/120 1/240	24′0″d 19′0″d	26′6″f 22′3″d	20′3″f 18′9″d
USG Light Steel Studs						
35ST8	3½″	16″	1/120 1/240	23′0″d 18′3″d	23′9″d 18′9″d	21′9″d 17′3″d
		24″	1/120 1/240	20′0″d 16′0″d	20′9″d 16′6″d	19′0″d 15′0″d
35ST10	3½″	16″	1/120 1/240	24′0″d 19′0″d	24′9″d 19′9″d	22′9″d 18′0″d
		24″	1/120 1/240	21′0″d 16′9″d	21′6″d 17′3″d	20′0″d 15′9″d

Limiting height for ½″ or ⅝″ thick panels and 5 psf uniform load perpendicular to partition or furring. Limiting criteria: d—deflection, f—bending stress. Consult local code authority for limiting criteria.

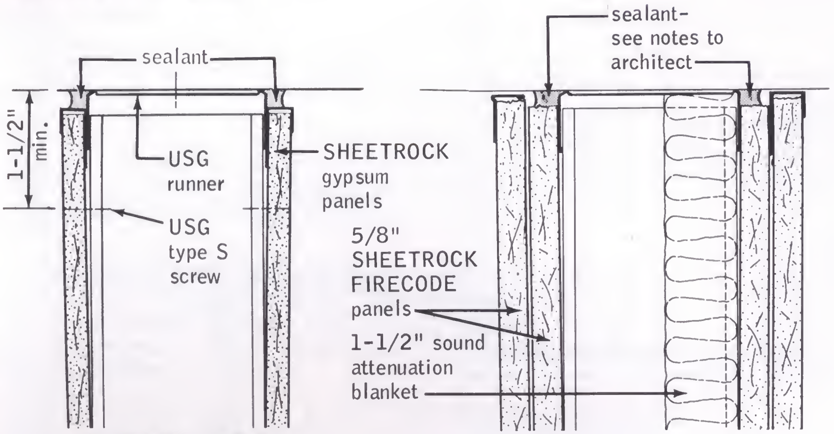
sound transmission loss—db

test no.	method	band center frequency—Hz																					STC
		125	160	175	200	250	315	350	400	500	630	700	800	1000	1250	1400	1600	2000	2500	2800	3150	4000	
CK-684-14	Lab	31	40	—	41	47	50	—	53	57	59	—	60	63	63	—	62	60	59	—	61	65	55
KSO-109006-a	Field	36	—	47	—	47	—	49	—	51	—	53	—	57	—	59	—	57	—	55	—	62	55
USG-134-FT-G&H	Lab	33	—	43	—	48	—	49	—	56	—	57	—	60	—	60	—	63	—	60	—	60	55
USG-114-FT-G&H	Lab	32	—	39	—	44	—	48	—	55	—	56	—	57	—	59	—	62	—	58	—	56	54
CK-684-13	Lab	29	38	—	40	46	49	—	54	56	58	—	60	62	63	—	61	62	61	—	63	64	53
CK-654-40	Lab	36	35	—	37	43	47	—	51	54	55	—	57	56	56	—	59	58	58	—	56	58	53
TL-69-159	Lab	30	37	—	40	42	48	—	52	53	54	—	55	57	58	—	60	59	52	—	49	52	52
BBN-700726	Lab	32	33	—	38	44	45	—	49	52	52	—	57	59	58	—	61	62	54	—	51	51	51
BBN-711005	Lab	35	32	—	40	45	49	—	52	51	48	—	51	51	50	—	52	52	49	—	48	52	50
BBN-760401	Lab	31	31	—	37	43	46	—	51	52	53	—	55	57	57	—	60	55	49	—	49	50	50
TL-69-153	Lab	28	36	—	37	38	44	—	48	52	54	—	55	57	59	—	60	58	51	—	47	49	49
TL-65-158	Lab	27	29	—	35	37	40	—	43	48	52	—	53	52	54	—	55	54	49	—	44	47	47
BBN-710310	Lab	27	30	—	34	37	40	—	44	45	47	—	49	49	49	—	49	45	41	—	43	45	45
TL-69-42	Lab	21	29	—	32	35	40	—	45	48	51	—	53	55	57	—	58	56	49	—	42	43	45

details

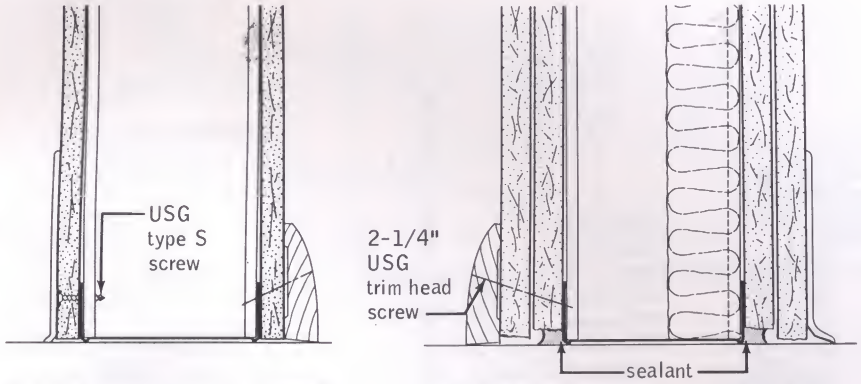
scale: 3″ = 1′-0″

ceiling attachments

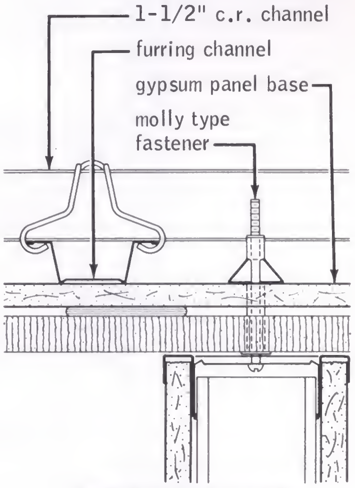

sealant
1-1/2" min.
USG runner
SHEETROCK gypsum panels
USG type S screw
sealant- see notes to architect
5/8" SHEETROCK FIRECODE panels
1-1/2" sound attenuation blanket

perimeter relief
ceiling intersection

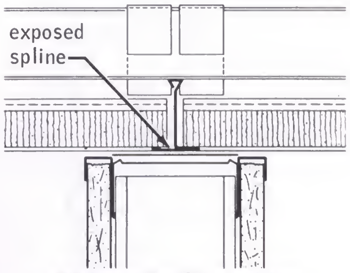
floor attachments



attachment of partition to ceiling

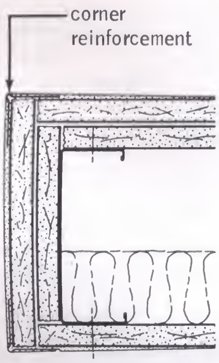


adhesively applied acoustical tile

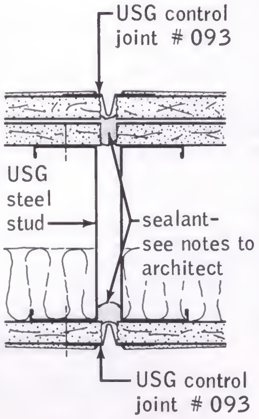


exposed grid system for acoustical tile & board

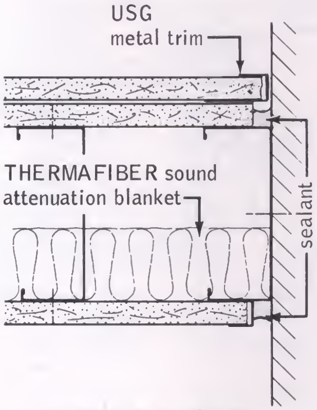
wall plan sections



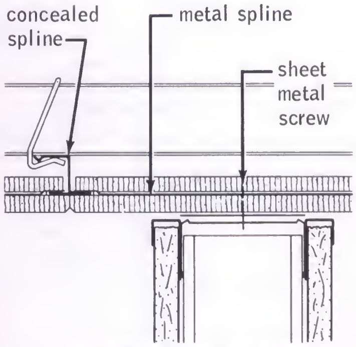
partition terminal



wall control joint



perimeter relief
wall intersection

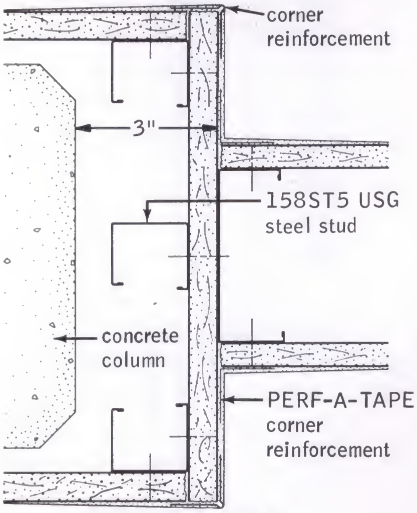


concealed grid system for acoustical tile

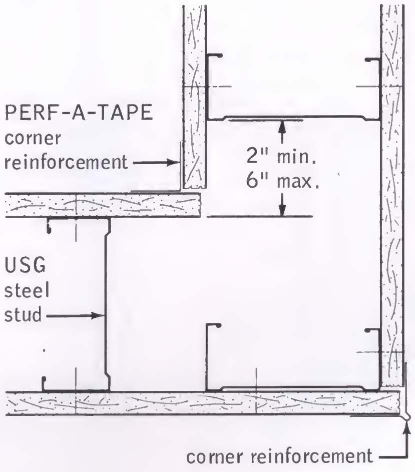
details

scale: 3″ = 1′-0″

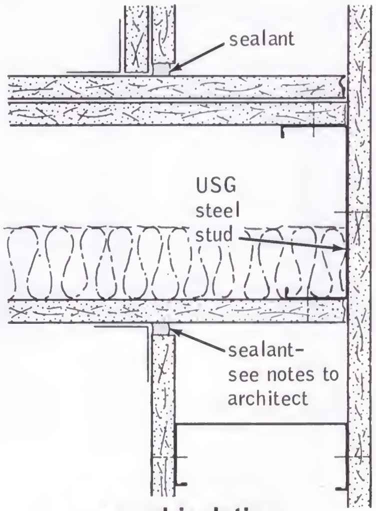
wall plan sections



partition relief
column intersection

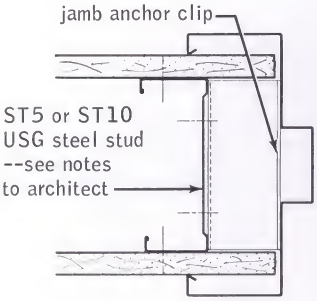


partition corner

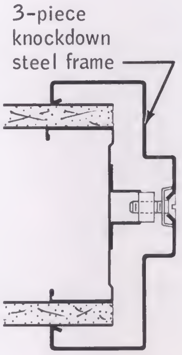


sound-isolating partition intersection

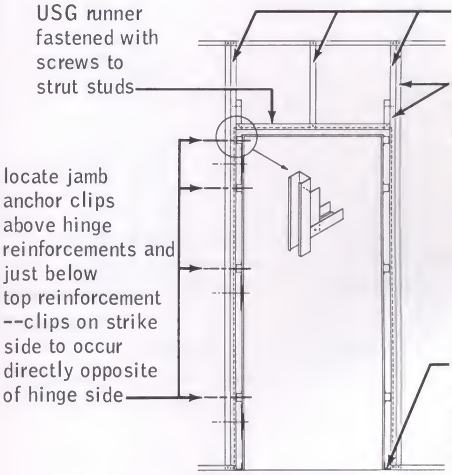
metal door frames



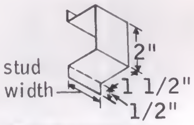
jamb
standard door



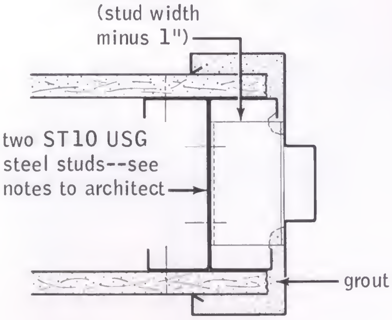
jamb
standard door


USG runner fastened with screws to strut studs
USG steel studs
continuous double USG steel stud each side of door
locate jamb anchor clips above hinge reinforcements and just below top reinforcement --clips on strike side to occur directly opposite of hinge side
floor anchor clips secured with no less than two suitable fasteners

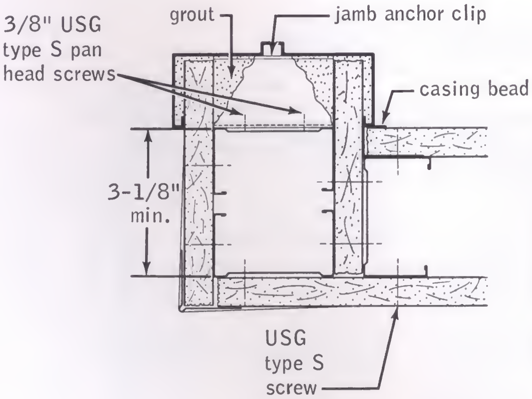
elevation
cross-section through frame



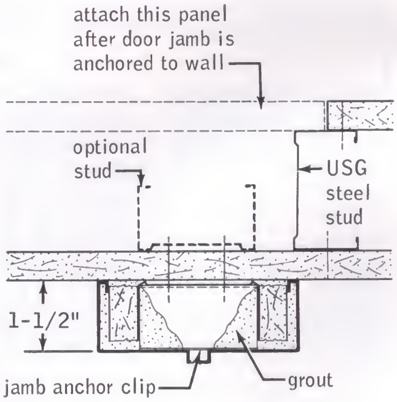
jamb anchor clip


jamb anchor (stud width minus 1")
two ST10 USG steel studs--see notes to architect
grout

jamb
heavy door



jamb
corner intersection



jamb
wall intersection

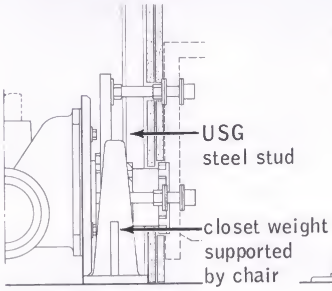
details

USG steel stud chase wall

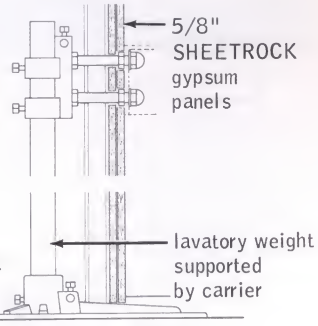
Chase walls provide vertical shafts where greater core widths are needed for pipe chase enclosures and other service installations. They consist of a double row of steel studs with gypsum panel cross braces between rows. Double-layer ½″ Sheetrock Gypsum Panels are screw-applied on both sides of studs and 1½″ Thermafiber Sound Attenuation Blankets are stapled to the back side of one base layer. The assembly offers 55 STC, suitable for party walls, and a 2-hour fire-resistance rating when ½″ Sheetrock Firecode "C" Gypsum Panels are used.

As an alternate, 2½″ steel stud cross braces screw-attached to chase wall studs may be used. When chase wall studs are not directly opposite, steel stud cross braces 24″ o.c. are anchored to continuous horizontal 2½″ runners screw-attached to chase wall studs.

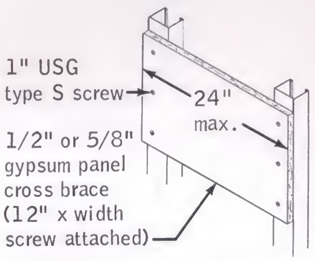
Limiting thickness is 24″; vertical brace spacing 48″ o.c. max.; limiting heights are shown on page 4. Other chase walls providing greater height may be constructed with wider or heavier steel studs (see tables, page 4, for design data). Minimum panel size is ½″ x 4′ x ceiling height.



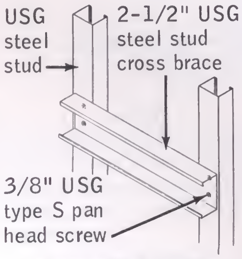
closet carrier



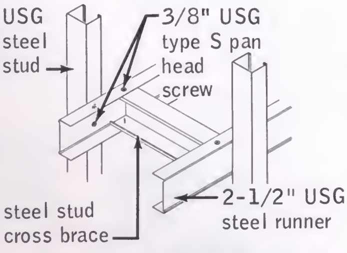
lavatory carrier



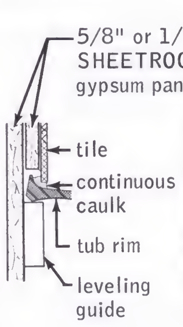
gypsum brace



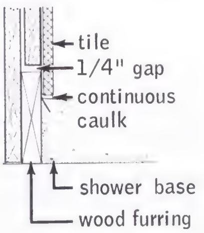
steel stud brace



steel stud & runner brace



tub



shower receptor

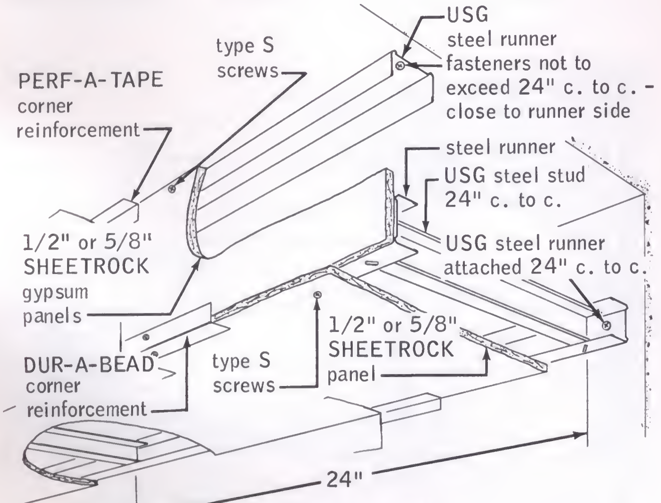
USG drywall soffit

This assembly consists of galvanized steel channel runners and studs faced with Sheetrock Gypsum Panels, screw attached. It is a lightweight, fast and economical method of filling over cabinets or lockers and of housing overhead ducts, pipes or conduits. The braced system permits constructing soffits with depths of 48″ and widths to 72″ without supplementary vertical studs. The unbraced system is for soffits up to 24″ x 24″.

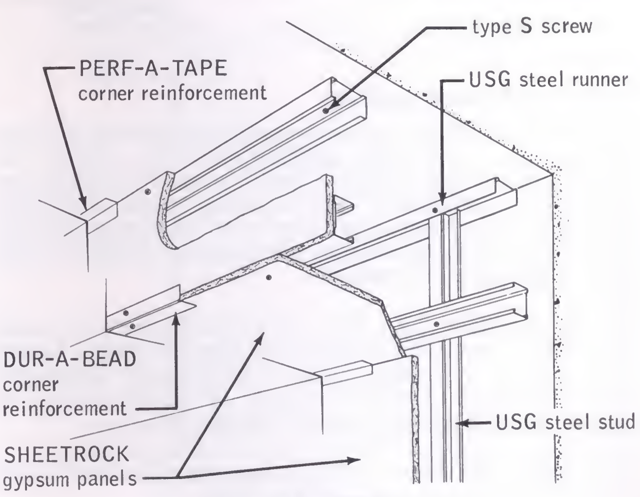
Construction recommendations—maximum dimensions (1):

gypsum board thickness (2)	steel stud size	maximum width	max. depth for max. width shown
½″	1⅝″	60″	48″
½″	2½″, 3⅝″	72″	36″
⅝″	1⅝″	60″	30″
⅝″	2½″, 3⅝″	72″	18″

(1) The construction is not designed to support loads other than its own dead weight and should not be used where it may be subjected to excessive abuse.
(2) The double-layer system and ⅜″ thick gypsum panels are not recommended for this construction.



braced soffit



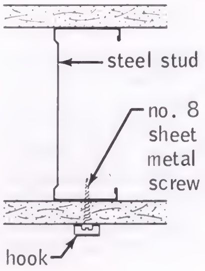
unbraced soffit

fixture attachments

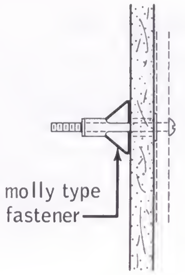
scale: 3″ = 1′-0″

fastener load table

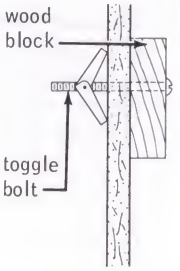
type fastener or attachment	allowable withdrawal resistance—lb.	allowable shear resistance—lb.
No. 8 sheet metal screw through SHEETROCK panel into steel stud	50	80
¼″ molly bolt into ½″ SHEETROCK panel only	35	80
¼″ toggle bolt into ½″ SHEETROCK panel only	40	60
No. 8 sheet metal screw in plastic plug	20	40
No. 8 sheet metal screw into 25-ga. sheet metal plate	60	100
molly bolt through SHEETROCK into steel stud		
⅛″ diam.	70	100
3/16″ diam.	80	125
¼″ diam.	155	175
bolts welded to 20-ga. plate		
3/16″ diam.	175	200
¼″ diam.	200	250
plumber's bracket att. with ¼″ bolts and 1½″ channels	200	200



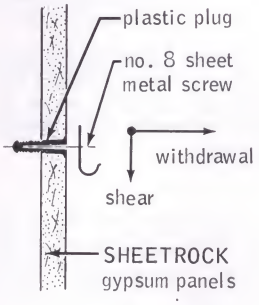
light



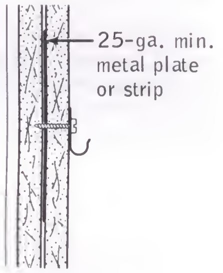
light



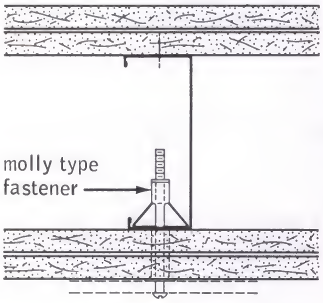
light



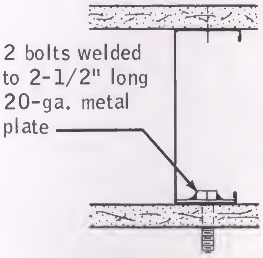
light



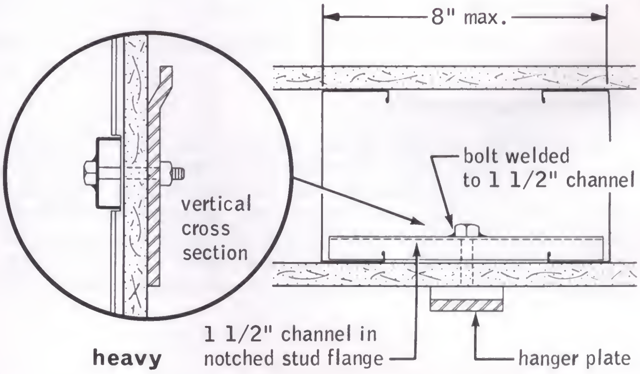
light



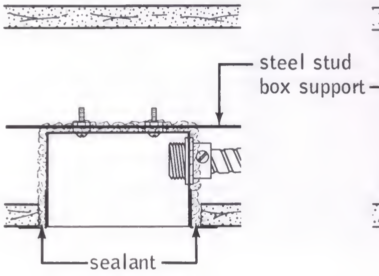
medium



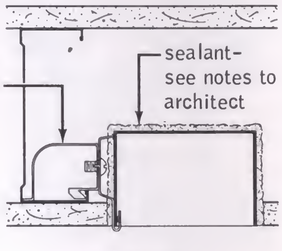
medium
grab bar attachment


8" max.
vertical cross section
bolt welded to 1 1/2" channel
1 1/2" channel in notched stud flange
hanger plate

heavy



outlet box



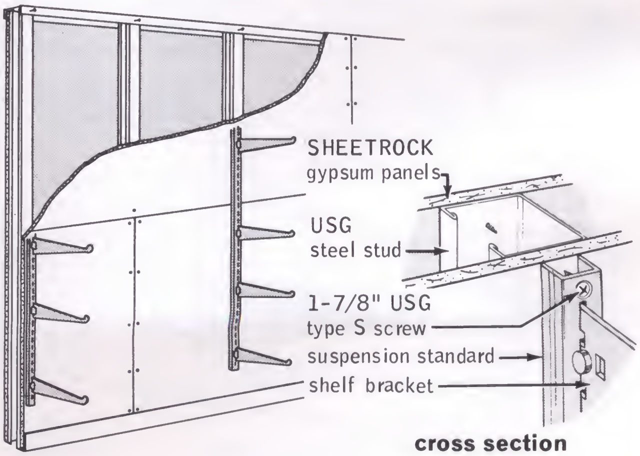
outlet box (alternate)

USG shelf-wall system

This system provides load-carrying walls for shelving in stores, offices, schools and other applications where required. Incorporating simple, quickly erected, economical steel stud components with Garcy shelf brackets, standards and accessories, the assembly offers all the advantages of steel stud-drywall construction plus the structural strength to support shelving and merchandise.

In this assembly, 3⅝″ USG Steel Studs spaced no more than 24″ o.c. are securely fastened to floor and ceiling runners and surfaced with either single or double-layer SHEETROCK Gypsum Panels. Slotted standards are screw-attached to studs or steel reinforcing inserted between layers.

The system provides a load-carrying partition but is not structurally load-bearing. Limiting height: 16′.



cross section

column fireproofing/test data

fire rating	column type	description	test no.		comments
2 hrs.	W10 X49	Gypsum Drywall Fireprfg—½″ SHEETROCK FIRECODE "C" panels around col—double layer over ea flange end—double layer on flange faces separ by USG 158ST5 stl studs & screw att—met beads on corners—joints fin†	UL Des X518 (was 10-2 hr)	(f)	
2 hrs.	W14 X228	Gypsum Drywall Fireprfg—½″ SHEETROCK FIRECODE "C" panels around col—panels screw att to 158ST5 stl studs at col corners—met corner beads—joints fin†	UL Des X521 (was 23-2 hr)	(f)	
2 hrs.	varies	Gypsum Drywall Fireprfg—3 layers ½″ SHEETROCK FIRECODE "C" panels around col—triple layer over ea flange end—inner layers on flange face separ by 158ST5 stl studs & screw att—met beads on corners—joints fin†	UL Des X524	(f)	Rating applies to tapered or constant-section prefabricated metal building columns
3 hrs.	W10 X49	Gypsum Drywall Fireprfg—3 layers ½″ SHEETROCK FIRECODE "C" panels around col—triple layer over ea flange end—inner layers on flange face separ by 158ST5 stl studs & screw att—met beads on corners—joints fin†	UL Des X515 (was 41-3 hr)	(f)	
3 hrs.	W14 X228	Gypsum Drywall Fireprfg—½″ SHEETROCK FIRECODE "C" panels around col—double layer over ea web face—panels screw att to 158ST5 stl studs at col corners—met corner beads—joints fin†	UL Des X514 (was 40-3 hr)	(f)	
4 hrs.	W14 X228	Gypsum Drywall Fireprfg—2 layers ½″ SHEETROCK FIRECODE "C" panels around col—panels screw att to 158ST5 stl studs at col corners—met corner beads—joints fin†	UL Des X507 (was 48-4 hr)	(f)	

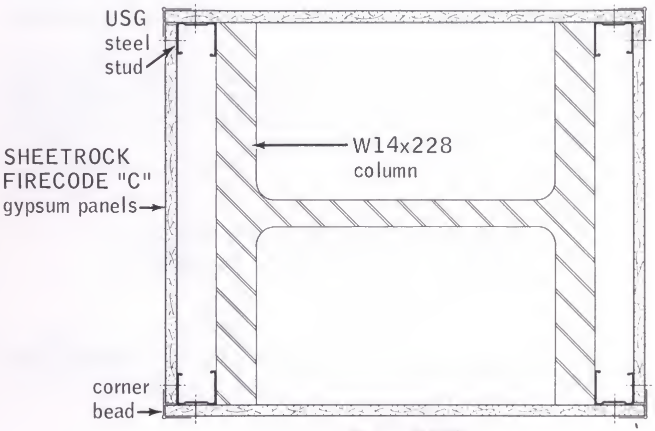
†Fire rating also applies with IMPERIAL FIRECODE "C" Gypsum Base and veneer plaster surface.

description

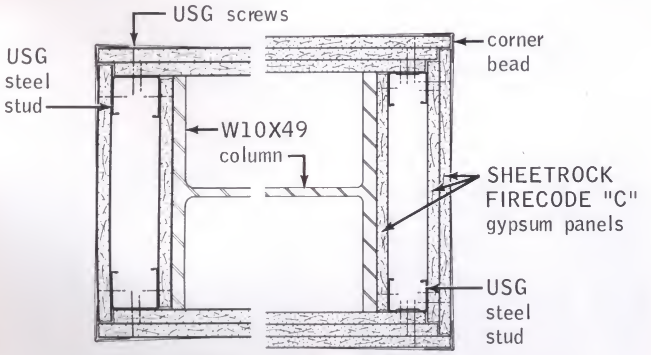
Drywall systems for column fireproofing consist of layers of SHEETROCK FIRECODE "C" Gypsum Panels screw-attached to 1⅝″ steel studs at column corners. DUR-A-BEAD or #800 Corner Bead concealed with a U.S.G. joint compound resists damage from impact at exterior corners.

These systems are easily and quickly installed without waiting for adhesives to dry. They provide lightweight, thin, compact steel column fire protection of up to four hours depending on the construction. Increased fire protection of primary structural framing members usually permits lower insurance premiums.

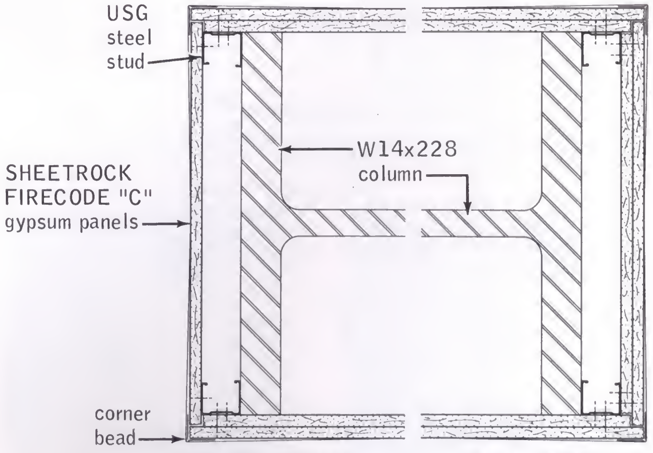
In these assemblies, a hard and abrasion-resistant surface may be obtained with a thin veneer (1/16″ to 3/32″ thick) of specially formulated, high-strength gypsum plaster. IMPERIAL Plaster is applied over IMPERIAL FIRECODE "C" Gypsum Base in lieu of SHEETROCK Panels. (See System Folder SA-912 for other IMPERIAL Plaster Systems.)



2-hr. X521
UL Design



2-hr. X518 3-hr. X515
UL Designs



3-hr. X514 4-hr. X507
UL Designs

exterior wall furring/metal channels

description	comments
USG Metal Furring Channels, 24″ o.c., ½″ Foil-Back SHEETROCK panels screw-attached, joints finished	Direct attachment by means of furring strips does not isolate surface membrane from structural stresses. No limiting height
1″ THERMAFIBER Z-Furring Insulation—USG Z-Furring Channels appl vert 24″ o.c.—½″ SHEETROCK gypsum panels screw-attached to channels—joints finished	Noncombustible system with mineral fiber insulation

with USG Metal Furring Channels

Exterior masonry walls of virtually any type—brick, tile, concrete block, monolithic concrete—are readily furred with Sheetrock Gypsum Panels screw-attached to USG Metal Furring Channels. Channels are either fastened directly to the masonry or furred using USG Adjustable Wall Furring Brackets and horizontal ¾″ channels. The latter construction provides up to 3″ additional space for pipes, conduits or ducts.

Sheetrock Panels for this assembly are available ½″ and ⅝″ thick and in either regular or foil-back types. With Foil-Back Sheetrock Panels, the system provides significant insulating value (see table) and is effective as a vapor barrier. Meets ASTM requirements for vapor permeability not exceeding 0.30 perms.

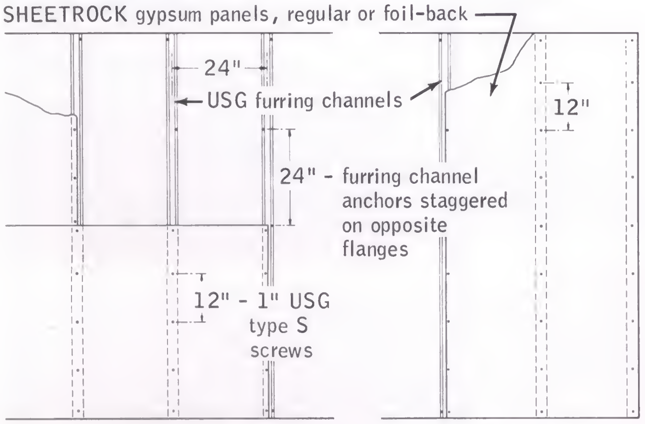
Sheetrock Gypsum Panels also provide an easily decorated facing when directly applied to interior masonry walls. See Gypsum Panels Product Folder SA-927 in this series for application methods and specifications.

thermal resistance (R) values
Foil-Back Sheetrock Panels (1)

½″ thickness	3.93
⅝″ thickness	4.04

(1) Resistances are based on vertical application, inside still air film, panel thickness with one reflective surface facing a ¾″ min. still air space.

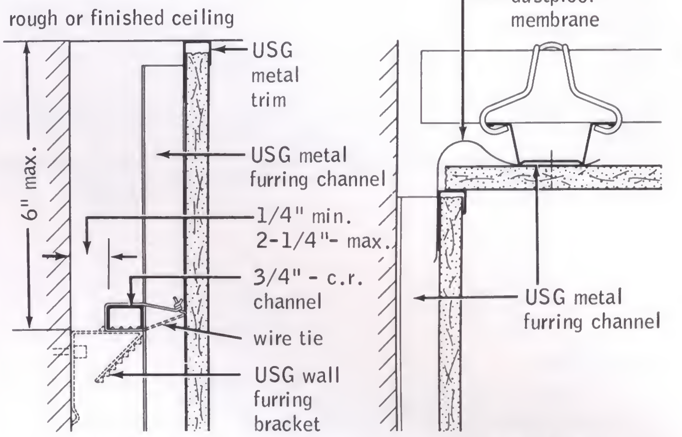
wall elevation—scale: ¼″ = 1′-0″


SHEETROCK gypsum panels, regular or foil-back
24"
USG furring channels
12"
24" - furring channel anchors staggered on opposite flanges
12" - 1" USG type S screws

horizontal application **vertical application**

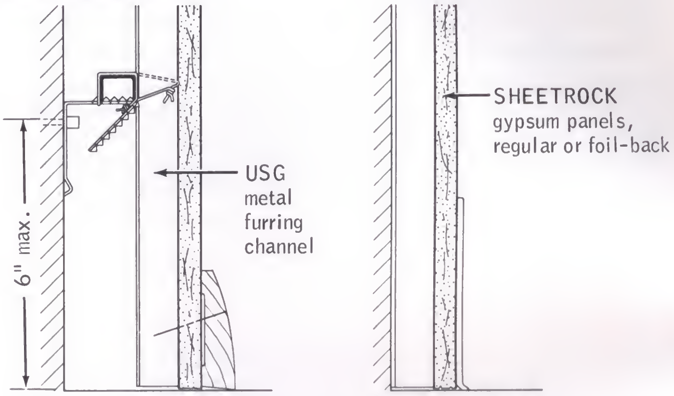
ceiling attachments

scale: 3″ = 1′-0″

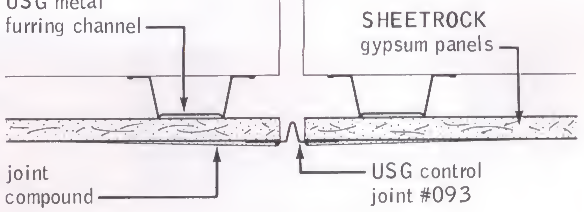


adjustable wall furring **suspended ceiling**

floor attachments

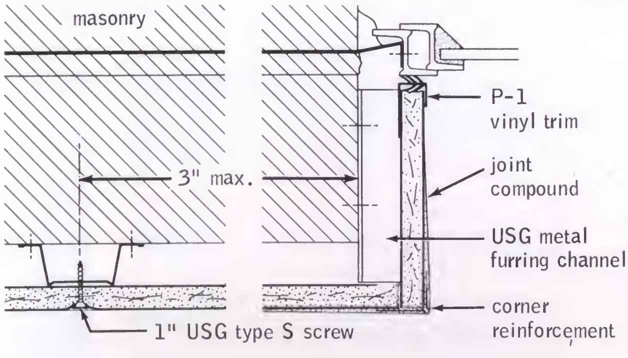

USG metal furring channel
6" max.
SHEETROCK gypsum panels, regular or foil-back

adjustable wall furring **direct furring**

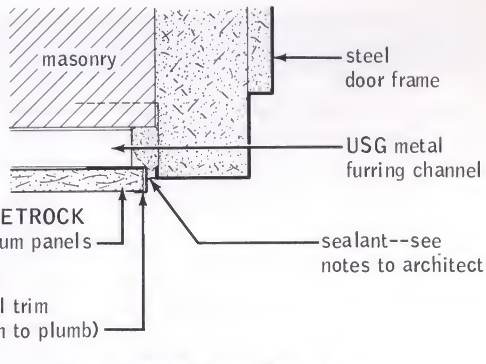


control joint

furred wall plan sections



metal window—jamb



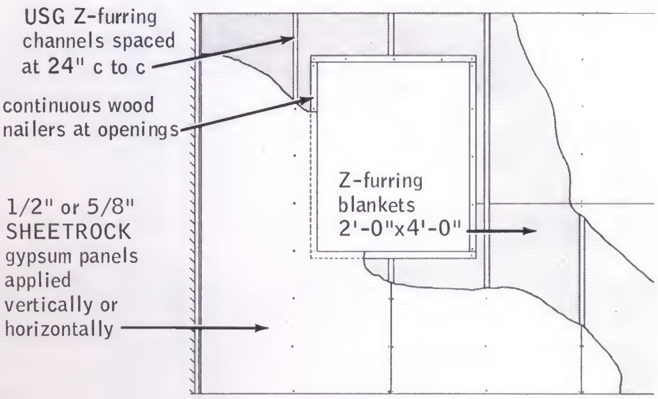
jamb—steel door frame

with USG Z-Furring Channels

In this assembly, USG Z-Furring Channels, spaced 24″ o.c., are used to mechanically attach THERMAFIBER Z-Furring Blankets or plastic foam insulation to exterior walls. The insulation panels are applied progressively as the Z-Furring Channels are attached to the wall. Gypsum panels are screw-attached to the channel flanges to provide a drywall surface isolated to a great degree from the masonry wall. In new construction and in remodeling, this system provides a highly insulative self-furring solid backup for SHEETROCK Gypsum Panels.

USG Z-Furring Channels, suitable for 1″ to 3″ thick insulation, are formed from hot-dipped galvanized steel for added corrosion resistance. Fire-resistant THERMAFIBER Z-Furring Blankets provide a noncombustible assembly and offer low heat transmission. Blankets are a semi-rigid spun mineral fiber mat that meet the requirements for Class A construction. For other applications, polystyrene and urethane rigid foam insulations offer a range of thicknesses and insulating values. Thermal insulation values (U-factors) for various assemblies are shown below.

wall elevation



design heat transmission coefficients (U-factors)

wall construction	nom. wall thickn.	unfin. wall	furred wall (1) (no insul.)	wall insulated with—									
				THERMAFIBER Z-Furring Blkts. (2)				rigid polystyrene (3)				rigid urethane (4)	
				1″	1½″	2″	3″	1″	1½″	2″	3″	1″	1½″
4″ face brick 8″ block	12″	.42	.26	.14	.11	.09	.07	.15	.12	.09	.07	.11	.08
4″ face brick 4″ com. brick	8″	.48	.28	.15	.12	.09	.07	.16	.12	.10	.07	.11	.08
poured conc. 140 lb./cu. ft.	8″	.69	.34	.17	.13	.10	.07	.18	.13	.11	.07	.12	.08
conc. block, sand & gravel aggregate	8″ 12″	.51 .47	.29 .28	.15 .15	.12 .12	.10 .10	.07 .07	.17 .16	.13 .12	.10 .10	.07 .07	.11 .11	.08 .08

(1) Interior wall finish: ½″ SHEETROCK Gypsum Panels. (2) k equals 0.24. (3) k equals 0.26. (4) k equals 0.15. All U-factors expressed in Btu/sq. ft./hr./°F, 75°F mean insulating temperature. Values based on 1965-6 ASHRAE Guide and winter condition (15 mph wind).

installing insulation

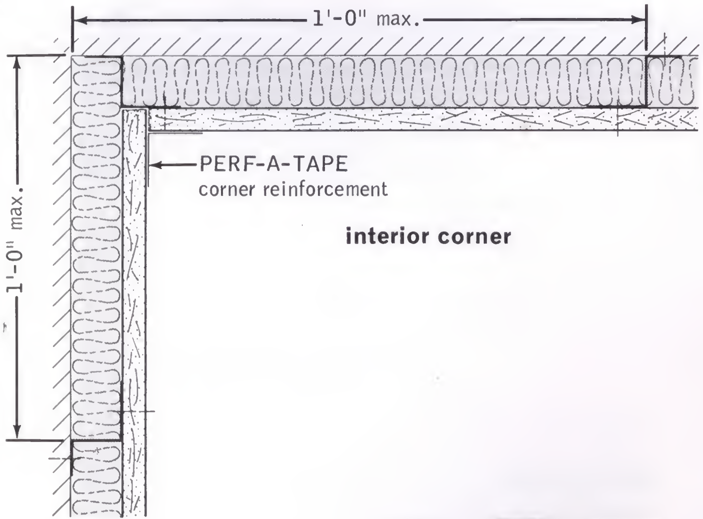
attaching Z-furring channel

erecting gypsum panel

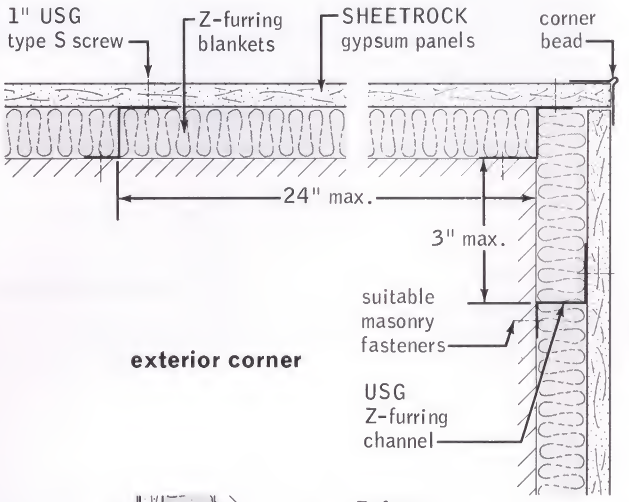
screw-attaching panel

exterior wall furring/Z-furring channels

scale: 3″ = 1′-0″

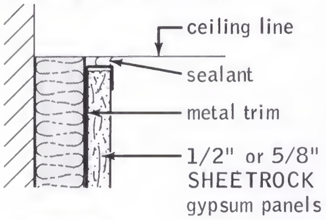


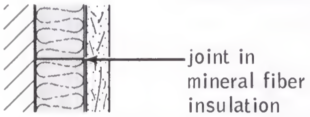
interior corner



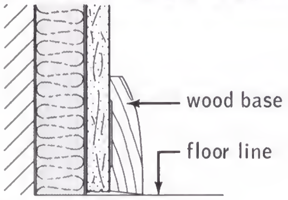
exterior corner

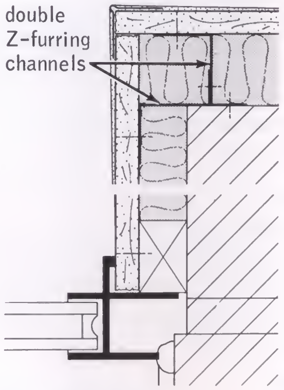
ceiling attachment



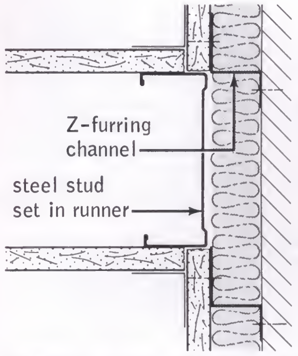


floor attachment & base

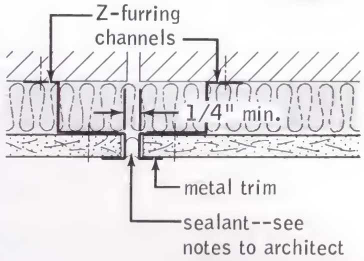




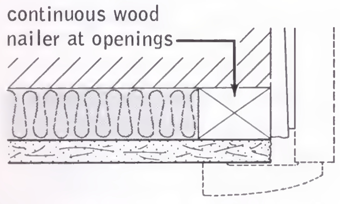
jamb



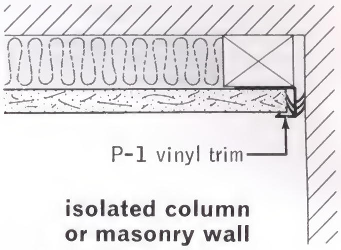
partition wall intersection



wall control joint

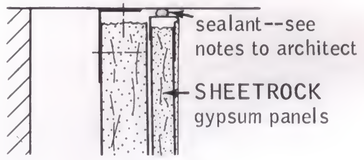


jamb cross-section

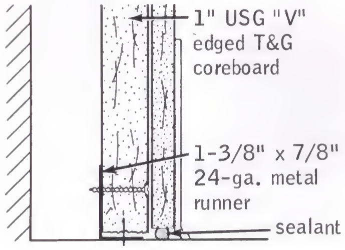


isolated column or masonry wall

free-standing furring



ceiling



floor

free-standing furring

Free-standing furring consists of 1″ USG Gypsum Coreboard screw-attached to USG Metal Angle Runners anchored to the floor and ceiling construction. A face layer of ½″ SHEETROCK Panels is job-laminated to the coreboard as an interior surface. The assembly offers a maximum of free space for encasement of pipes, ducts and conduits and minimizes possibilities for photographing or shadowing to occur over fasteners and furring. Limiting height: 10′ with restraints spaced up to 10′, 9′ with restraints 10′ to 14′, 8′ with restraints over 14′.

ceilings/test data

fire rating	description	test no.	sound rating STC	sound rating IIC	comments
N/A	⅝″ SHEETROCK FIRECODE gypsum panels—1½″ cr chan 4′ o.c.—USG met fur chan 24″ o.c.—panels screw att 12″ o.c.—joints fin clg wt 3	USG-5-FT-G&H (s)	45		"Up and over" attenuation—suspension and ceiling membrane only
1 hr. (beam 1 hr.)	½″ SHEETROCK FIRECODE "C" gypsum panels—USG steel joists 24″ o.c.—dbl layer gypsum panel clg and ⅝″ T&G plywd flr att to joists with Type S-12 screws—dbl layer gypsum panels around beam—joints exp clg wt 4	UL Des L524 (f)	N/A		
2 hrs. (beam 2 hrs.)	½″ SHEETROCK FIRECODE "C" gypsum panels—furred or susp—USG met fur chan 24″ o.c.—panels att with 1″ Type S screws 12″ o.c.—joints exp or fin—2½″ conc on riblath or corrug stl deck over bar joist clg wt 3	UL Des G515 (f) (was 221-2 hr) USG-189-FT-G&H (s)	54		STC based on furred interrupted ceiling, 1½″ sound attenuation blankets extending 4′ beyond partition
2 hrs. (beam 2 hrs.)	⅝″ SHEETROCK FIRECODE "C" gypsum panels—2″ USG gypsum flr plank welded to bar joists 48″ o.c.—¾″ MASTICAL underlayment compd—(1) ⅛″ vinyl flr tile (2) 39-oz carpet & 40-oz pad—USG met fur chan 24″ o.c. wire-tied to joists—panels screw-att 12″ o.c.—joints fin clg wt 3	UL Des G516 (f) (was 266-2 hr) (1) BBN-720506 (s) (1) BBN-720507 (s) (2) BBN-720509 (s)	54	37 64	Includes 2-hour unrestrained beam
2 hrs. (beam 3 hrs. & 4 hrs.)	½″ SHEETROCK FIRECODE "C" gypsum panels—susp grid with main run 4′ o.c. and cross tees 2′ o.c.—gypsum panels screw-att below grid—joints fin—2½″ conc on riblath over bar joist clg wt 3	UL Des G527 (f)	N/A		4-hour beam rating based on ⅝″ thick panels
2 hrs. and 3 hrs.	⅝″ SHEETROCK FIRECODE "C" gypsum panels—USG met fur chan 24″ o.c.—panels att with 1″ Type S screws 12″ o.c in field and 8″ o.c. at ends—joints fin—prestressed conc units with 6″ deep stems 48″ o.c. clg wt 3	UL Des J502 (f) UL Des J503 (f) UL Des J504 (f)			2-hour rating based on 2″ thick concrete slab; 3-hour rating based on 2¾″ regular or 2½″ lightweight concrete slab
3 hrs. (beam 3 hrs.)	⅝″ SHEETROCK FIRECODE "C" gypsum panels—USG met fur chan 24″ o.c.—panels att with 1″ Type S screws 12″ o.c.—joints exp or fin—3″ conc on riblath over bar joist clg wt 3	UL Des G512 (f) (was 82-3 hr)	N/A		

beam applications

fire rating	description	test no.	STC	IIC	comments
2 hrs. (beam only)	Gypsum Drywall Caged Beam Fireprfg—1⅝″ USG stl run chan brackets 24″ o.c.—1⅜″x⅞″ corner angles att to chan brackets—dbl layer ⅝″ SHEETROCK FIRECODE gypsum panels att with Type S screws—met beads on corners—joints fin—2½″ conc deck on fluted stl flr	UL Des N501 (f) (was 254-2 hr) UL Des N502 (f) (was 255-2 hr)			Design N502 based on 1⅝″ steel runner for corner angles and coped brackets
3 hrs. (beam only)	Gypsum Drywall Caged Beam Fireprfg—1⅝″ USG stl run chan brackets 24″ o.c.—1⅜″ x ⅞″ corner angles att to brackets—3 layers ⅝″ SHEETROCK FIRECODE gypsum panels att with Type S screws—1″ 20-ga hex mesh on bottom over middle layer—met beads on corners—joints fin—2½″ conc deck on fluted stl flr	UL Des N505 (f) (was 214-3 hr)			Extends drywall use to beam protection. Fire rating for restrained assembly; 2-hour rating for unrestrained assembly

description

These floor/ceilings consist of SHEETROCK FIRECODE "C" Gypsum Panels screw-attached to USG Metal Furring Channels clipped or wire-tied to suspended runner channels or wire-tied to supports. Panels are also screw-attached below a suspended grid system. For long spans to accommodate large ducts or pipes in the ceiling space, the USG Steel Stud is used as ceiling furring or in a separate system (see table below).

The USG Steel Stud Framing System is ideal for ceilings over office areas in pitched-roof buildings and in modular buildings where ceiling framing is independent of the floor above; accommodates light troffers, ducting and electrical services.

Gypsum panels for these assemblies are available in ½″ and ⅝″ thicknesses and in five types (see Specifications, page 16). Foil-Back SHEETROCK Panels offer an effective vapor barrier and increase the overall "U" factor of the roof-ceiling assembly (see table at right). Regular SHEETROCK provides a firm base for acoustical tile adhesively applied. USG Exterior Gypsum Ceiling Board is suitable for exterior ceilings and soffits with indirect exposure to the weather.

limitations

USG Steel Studs are not designed to carry live loads, mechanical equipment or material storage (see load table below and details, page 15). Maximum spacing: main support members and hangers 48″ o.c. For single-layer panels, maximum steel stud and furring channel spacing is 24″ o.c. for horizontal application and 16″ o.c. for vertical application. For panels used as base for spray-applied texture finish, maximum frame spacing is 16″ o.c. for ½″ thick panels horizontally applied; vertical panel application not recommended.

thermal resistance (R) values
Foil-Back SHEETROCK Panels (1)

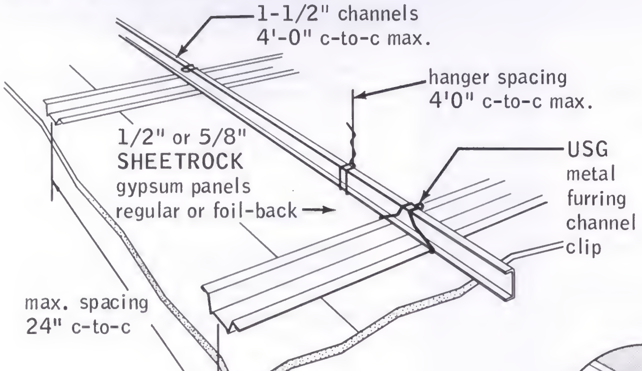
thickness	½″	⅝″
summer conditions	4.92	5.03
winter conditions	2.73	2.84

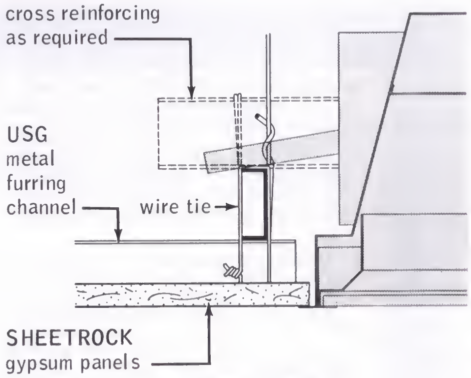
(1) Resistances are based on horizontal application, inside still air film, panel thickness and one reflective surface facing a ¾″ min. still air space.

details

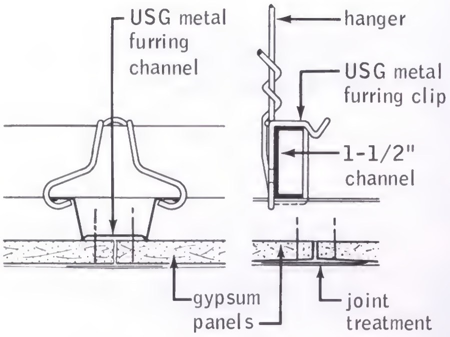
scale: 3″ = 1′-0″

USG metal furring channel

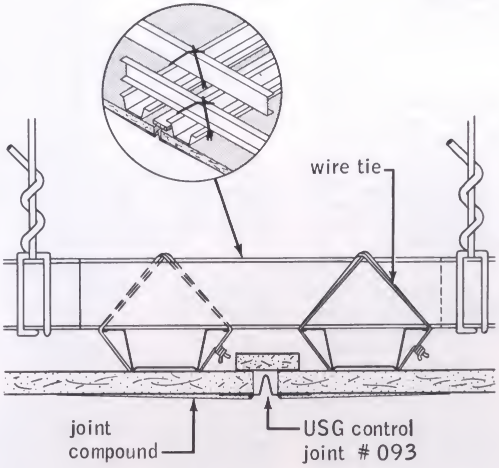




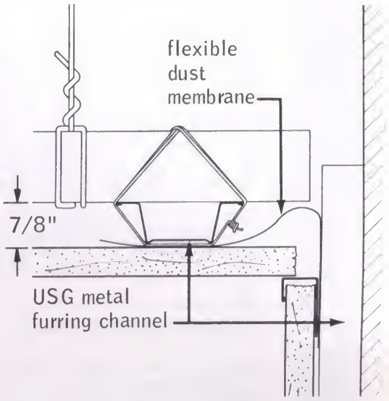
lighting fixture



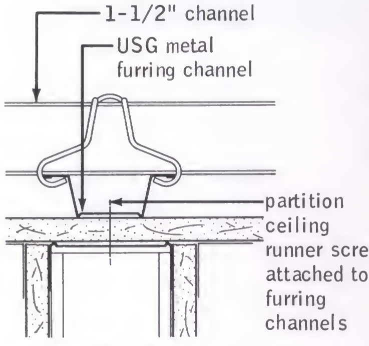
grillage suspension



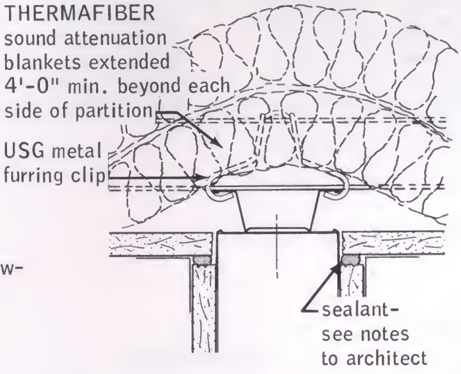
control joint



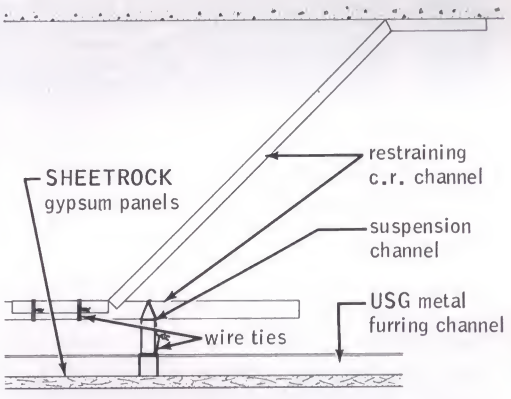
wall intersection



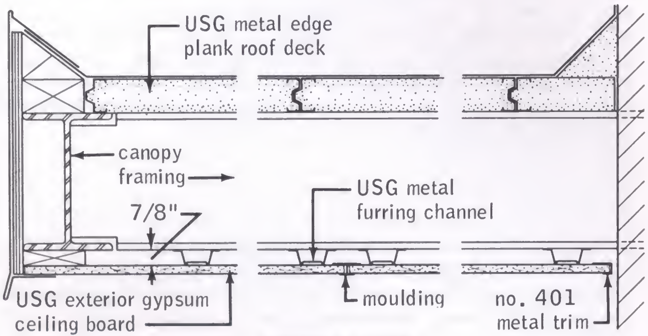
continuous ceiling



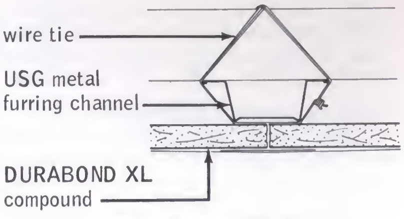
interrupted ceiling



optional bracing for lateral ceiling loads



exterior soffit

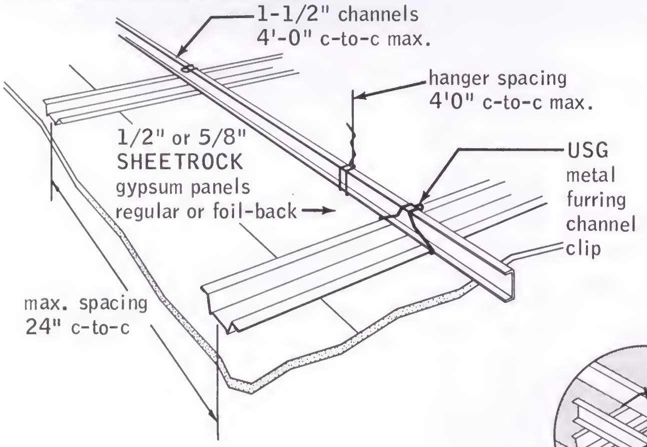


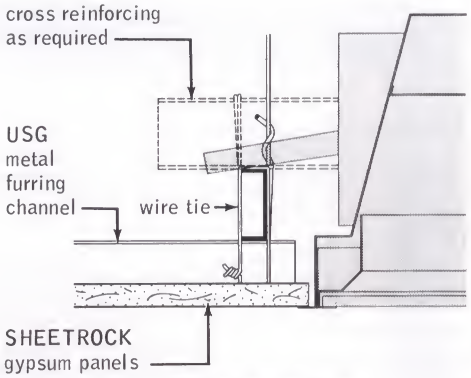
exterior soffit joint

details

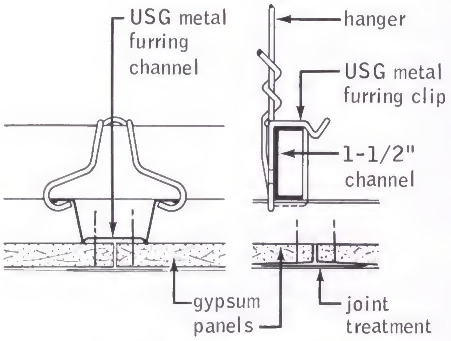
scale: 3″ = 1′-0″

USG metal furring channel

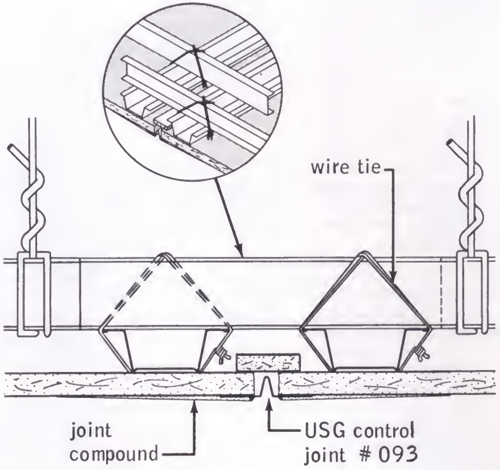




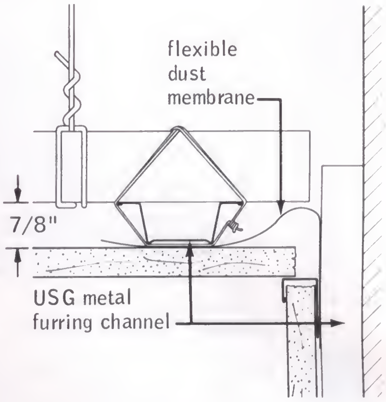
lighting fixture



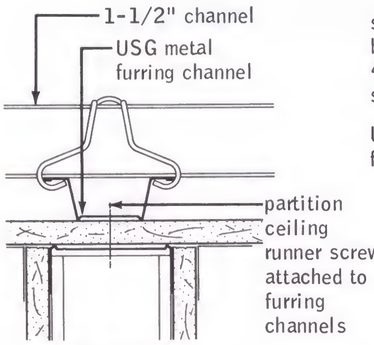
grillage suspension



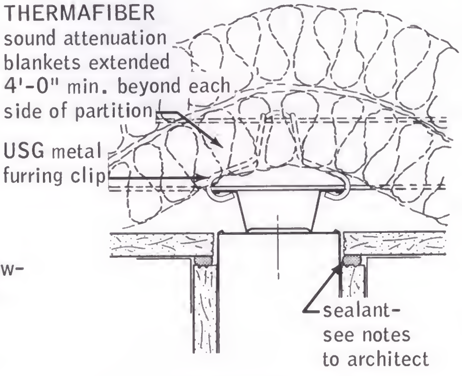
control joint



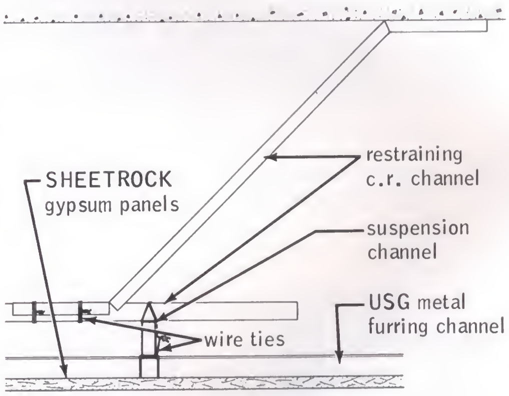
wall intersection



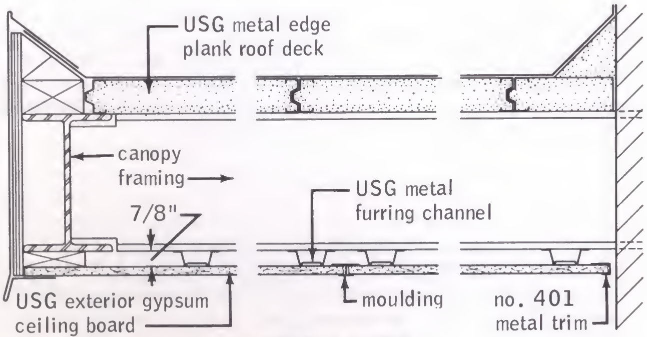
continuous ceiling



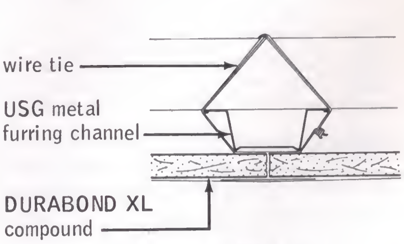
interrupted ceiling



optional bracing for lateral ceiling loads



exterior soffit

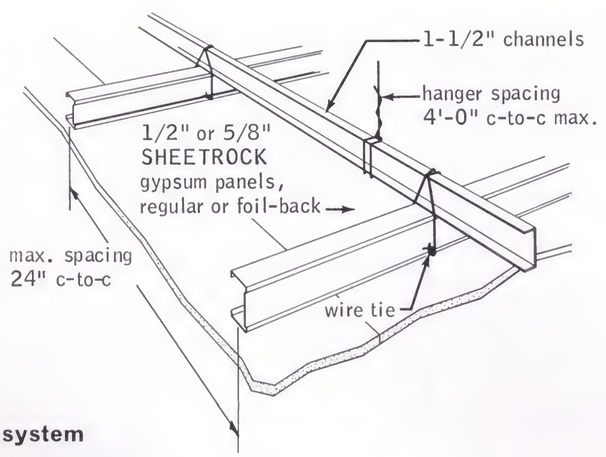


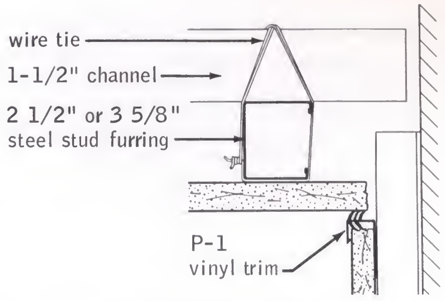
exterior soffit joint

details

scale: 3″ = 1′-0″

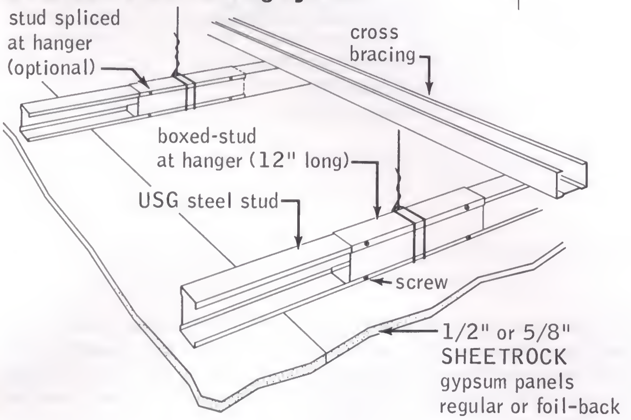
USG steel stud furring

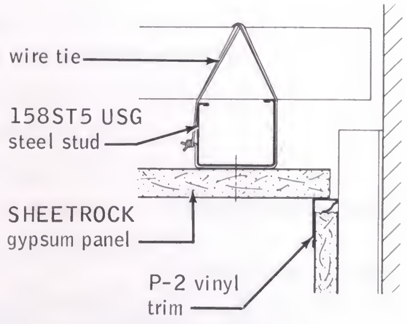




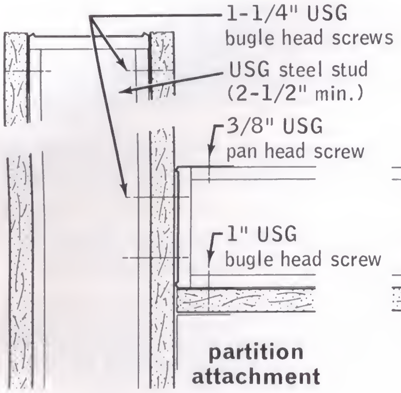
wall intersection

USG steel stud framing system

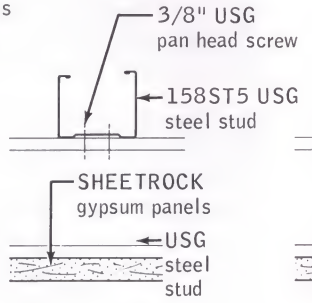




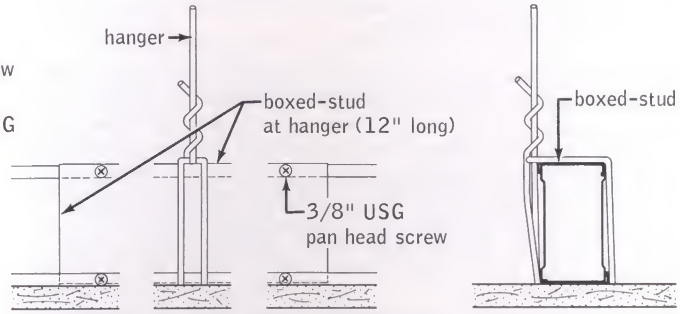
wall intersection (optional)



partition attachment



cross bracing



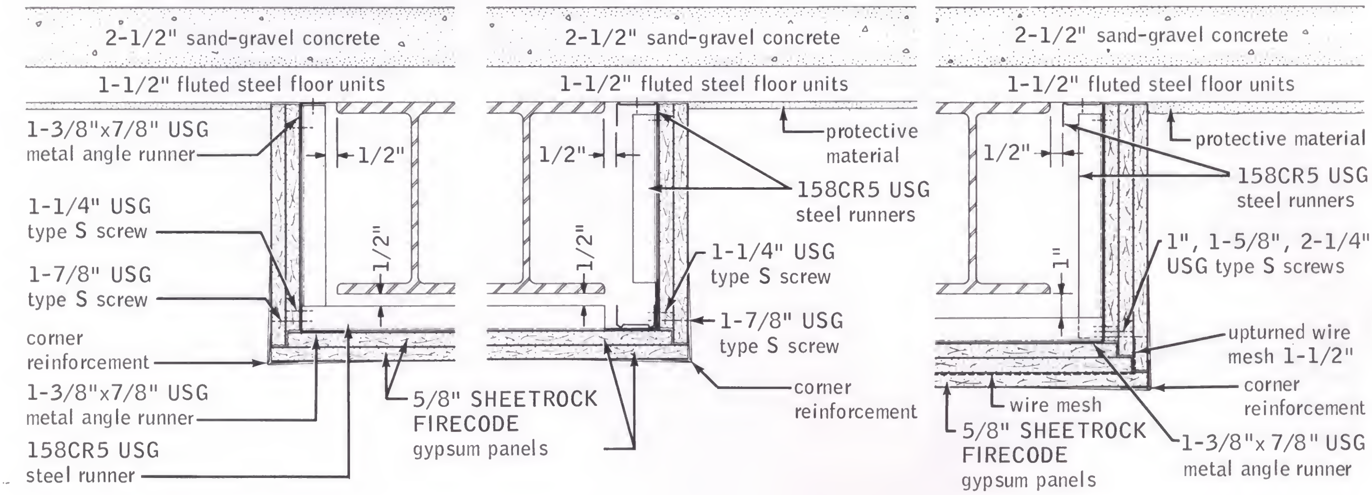
hanger attachment

limiting span—USG Steel Stud Ceiling System

stud style		212ST5			358ST5			40ST5			212ST10			358ST10			40ST10			60ST10		
stud spacing-in.		12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24	12	16	24
single span																						
uniform load —psf	5	11′0″	10′3″	9′0″	14′6″	13′6″	11′9″	15′3″	14′3″	12′6″	13′0″	12′0″	10′6″	17′3″	16′0″	14′0″	18′6″	17′0″	15′0″	23′6″	21′9″	19′0″
	10	8′9″	8′3″	6′0″	11′6″	10′9″	8′9″	12′3″	11′3″	9′3″	10′6″	9′6″	8′6″	13′9″	12′6″	11′0″	14′9″	13′6″	11′9″	18′9″	17′3″	15′0″
	15	7′9″	6′9″	5′6″	10′0″	8′9″	7′3″	10′9″	9′3″	7′9″	9′0″	8′6″	7′3″	12′0″	11′0″	9′9″	13′0″	11′9″	10′3″	16′3″	15′0″	13′0″
	20	6′9″	5′9″		8′9″	7′6″	6′3″	9′3″	8′0″	6′6″	8′3″	7′6″	6′9″	11′0″	10′0″	8′9″	11′9″	10′9″	9′6″	14′9″	13′9″	12′0″
double and triple span																						
uniform load —psf	5	11′3″	10′6″	9′3″	14′9″	13′9″	12′0″	15′9″	14′6″	12′9″	13′3″	12′3″	10′9″	17′6″	16′0″	14′0″	18′9″	17′3″	15′3″	23′9″	22′0″	19′3″
	10	9′0″	8′3″	7′3″	11′9″	10′9″	9′6″	12′6″	11′6″	10′0″	10′6″	9′9″	8′6″	13′9″	12′9″	11′3″	15′0″	13′9″	12′0″	19′0″	17′6″	15′3″
	15	7′9″	7′3″	6′3″	10′3″	9′6″	7′6″	10′9″	10′0″	7′6″	9′3″	8′6″	7′6″	12′0″	11′3″	9′9″	13′0″	12′0″	10′6″	16′6″	15′3″	13′3″
	20	7′0″	6′6″	5′3″	9′3″	8′6″	5′6″	9′9″	8′6″	5′6″	8′3″	7′9″	6′9″	11′0″	10′3″	8′9″	11′9″	11′0″	9′6″	15′0″	13′9″	12′0″

details

beam protection (beam only)



2-hr. UL design no. N501

2-hr. UL design no. N502

3-hr. UL design no. N505 (restrained)
2-hr. UL design no. N505 (unrestrained)

2-1/2" sand-gravel concrete
1-1/2" fluted steel floor units
1-3/8"x7/8" USG metal angle runner
1/2"
1-1/4" USG type S screw
1-1/2"
1-7/8" USG type S screw
corner reinforcement
1-3/8"x7/8" USG metal angle runner
158CR5 USG steel runner
5/8" SHEETROCK FIRECODE gypsum panels
2-1/2" sand-gravel concrete
1-1/2" fluted steel floor units
protective material
1/2"
158CR5 USG steel runners
1-1/2"
1-1/4" USG type S screw
1-7/8" USG type S screw
corner reinforcement
2-1/2" sand-gravel concrete
1-1/2" fluted steel floor units
protective material
1/2"
158CR5 USG steel runners
1", 1-5/8", 2-1/4" USG type S screws
1"
upturned wire mesh 1-1/2"
corner reinforcement
wire mesh
5/8" SHEETROCK FIRECODE gypsum panels
1-3/8"x 7/8" USG metal angle runner

specifications

notes to architect

1. *U.S.G. will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on U.S.G. products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.*

2. *Gypsum panel surfaces should be isolated with control joints or other means where:* **(a)** *partition, furring or column fireproofing abuts a structural element (except floor) or dissimilar wall or ceiling;* **(b)** *ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration;* **(c)** *construction changes within the plane of the partition or ceiling;* **(d)** *partition or furring run exceeds 30′;* **(e)** *ceiling dimensions exceed 50′ in either direction;* **(f)** *the area within separate ceiling sections exceeds 2,500 sq. ft.;* **(g)** *exterior soffits exceed 30′ in either direction* **(h)** *wings of "L", "U" and "T"-shaped ceiling areas are joined;* **(i)** *expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints, as may less-then-ceiling-height door frames if control joints extend to ceiling from both corners.*

3. *Penetrations of the gypsum panel diaphragm, such as door frames, borrowed-light openings, vents, grilles, access panels and light troffers, require additional reinforcement at the corners to distribute concentrated stresses if a control joint is not used.*

4. *Metal door and borrowed-light frames should be at least 18-ga. steel, shop primed, and have throats accurately formed to overall thickness of partition. They should be anchored at floor with 14-ga. steel plates welded to trim flanges, with provision for two power-driven anchors or equal per plate. Jamb anchor clips should be 18-ga. steel welded in jamb (see details, page 6). Stud reinforcing described below is screw-attached to jamb anchor clips. Three-piece frames may also be used with these partitions.*

For hollow-core doors up to 2′8″ wide (5 psf max.), ST5 steel studs and runners may be used for framing the opening. For solid-core doors and hollow-core doors 2′8″ to 4′0″ wide (10 psf max.), rough framing should be ST10 steel studs and runners. For doors over 4′0″ wide, double doors and extra-heavy doors such as used for X-ray rooms (15 psf max.), two ST10 studs placed back-to-back should be used.

For added door frame restraint, spot-grouting at the jamb anchor clip is recommended. Spot-grouting is required for solid-core doors and doors over 2′8″ wide. Apply DURABOND or USG Ready-Mixed Joint Compound just before inserting board into frame; do not terminate gypsum panel against trim return.

5. *Additional chases can be provided in steel studs (except in fire-rated construction) by cutting round holes up to ¾ of stud width, spaced 12″ apart.*

6. Ceramic Tile—*SHEETROCK W/R Gypsum Panels are recommended as a base on walls for adhesive application of ceramic, metal and plastic tile.*

7. Fixture Attachment—*Lightweight fixtures and trim should be installed using plastic plugs or expandable anchors for screw attachment. Wood or metal mounting strips for cabinets and shelving should be attached with toggle bolts through the gypsum panels near studs (see details, page 8).*

8. *Wood base should be applied with trim head screws placed at each stud and midway between studs (12″ o.c.).*

9. *Where these partitions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the partition. Back-to-back penetrations of the diaphragm and flanking paths should be eliminated. Door and borrowed-light openings are not recommended in sound control partitions.*

10. *For adhesive applications of TEXTONE Gypsum Panels, only DURABOND Adhesives are recommended; other adhesives may not be compatible with the vinyl surface.*

11. *In ceilings, spacing of hangers and channels is designed to support only the dead load. Heavy concentrated loads should be independently supported. To prevent objectional sag in the gypsum panel ceiling, the weight of overlaid unsupported insulation should be limited to a uniform load of* 1.2 *psf for ½″ thick panels and* 1.4 *psf for ⅝″ thick panels. A vapor barrier should be installed in all exterior ceilings, and the plenum or attic space vented with a min. ½-sq. in. net free vent area per sq. ft. of horizontal surface.*

12. *To comply with UL Floor-Ceiling Designs G*512 *and G*515, *gypsum panel end joints should be aligned and backed by 2″ wide face panel strips laid over the joints. Face panels should be fastened to continuous furring channels centered 2″ either side of joints. For UL Designs J*502, *J*503, *and J*504, *end joints should be backed by 3″ wide strips and furring channels centered 3¼″ either side of joints.*

13. *Back-blocking of ceiling end joints is recommended when construction occurs during adverse job or weather conditions. Float end joints between furring channels and back-block joint with a continuous 8″ face panel strip adhesively applied, or screw-attach floated ends to a 5-ft. channel centered over joint.*

14. *Treatment of joints and screwheads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.*

15. *All exposed surfaces of USG Exterior Gypsum Ceiling Board should receive two coats of USG exterior paint.*

16. *During periods of low outside temperature, condensation may form on exterior walls, collecting airborne dirt to produce photographing or shadowing over fasteners and furring. This natural phenomenon occurs through no fault of the products.*

17. *Shallow electrical outlet boxes are recommended when insulation less than 1½″ thick is used in furring systems.*

18. Warning: *Rigid foam (cellular plastic) insulation is combustible and may constitute a fire hazard if improperly used or installed. It should not be exposed or inadequately protected. Use only as directed by the specific instructions accompanying the product.*

19. *See U.S.G. product folders in this series: Gypsum Panels & Accessories Folder SA-*927 *for information on system components; Paint Products Folder SA-*933 *for paint specifications; Plasters, Bases & Accessories Folder SA-*917 *for information on veneer finish products.*

The most expedient way to obtain additional information on fire resistance ratings, sound transmission or details not covered in this publication is to direct inquiries to UNITED STATES GYPSUM sales offices.

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. USG Steel Studs—158ST5 (1⅝″), 20ST5 (2″), 212ST5 (2½″), 30ST5 (3″), 358ST5 (3⅝″), 40ST5 (4″), 60ST5 (6″), 20ST10 (2″), 212ST10 (2½″), 30ST10 (3″), 358ST10(3⅝″), 40ST10 (4″), 60ST10 (6″), 35ST8 (3½″), 35ST10 (3½″).

b. USG Steel Runner—158CR5 (1⅝″), 20CR5 (2″), 212CR5 (2½″), 30CR5 (3″), 358CR5 (3⅝″), 40CR5 (4″), 60CR5 (6″), 20CR10 (2″), 212CR10 (2½″), 30CR10 (3″), 358CR10 (3⅝″), 40CR10 (4″), 60CR10 (6″), 35CR8 (3½″), 35CR10 (3½″).

c. USG Metal Furring Channel.

d. USG Metal Furring Channel Clip.

e. USG Z-Furring Channel (1″) (1½″) (2″) (3″).

f. Cold-Rolled Channels (¾″) (1½″).

g. 8-ga. Galvanized Hanger Wire.

h. 18-ga. Galvanized Tie Wire.

i. USG Adjustable Wall Furring Bracket.

j. Faceboards—(½″) (⅝″) thick, 48″ wide Sheetrock (Regular) (Foil-Back) (Firecode) (Firecode "C") (Sheetrock W/R Firecode "C") (Textone) Gypsum Panels, USG Exterior Gypsum Ceiling Board, lengths as required.

k. Backing Board—¼″ Sheetrock Gypsum Panels.

l. Insulation
  —Thermafiber Sound Attenuation Blankets (1″) (1½″) (2″) x 24″ x 48″.
  —Thermafiber Z-Furring Blankets, (1″) (1½″) (2″) (3″) x24″x48″.

m. Adhesive
  —Durabond Joint Compound-Taping or 90 (*for double-layer application and column fireproofing*).
  —Durabond 200 (*for single-layer application*).
  —Durabond (500) (200) (*for furring and double-layer applications*).

n. Fasteners—USG Brand Screws: ⅜″ Type S, pan head or hex washer head; ⅜″, ½″ Type S-12, pan head, hex washer head or low-profile head; ⅞″, 1″, 1¼″, 1 5/16″, 1⅝″, 1⅞″, 2¼″ Type S, bugle head; 1″, 1⅝″, 2¼″ Type S or S-12, trim head; 1½″ Type G, bugle head; 1¼″ Type W, bugle head; 1¼″ GWB-54 annular ring nail.

o. USG Trim No. (200-A) (200-C) (401) (402) (P-1) (801-A) (801-B).

p. USG Corner Bead—(No. 103 Dur-A-Bead) (No. 104 Dur-A-Bead) (No. 800) Metal Corner Reinforcement.

q. USG Control Joint No. 093.

r. Joint Treatment—(select a U.S.G. Joint System).

s. Caulking—USG Acoustical Sealant.

t. USG Plastic Grommets.

u. USG 1⅜″ x ⅞″ x 24-ga. Galvanized Metal Angles.

Part 3: execution

3.1 partition installation

3.1.1 stud system erection

Attach steel runners at floor and ceiling to structural elements with suitable fasteners located 2″ from each end and spaced 24″ o.c., or to suspended ceilings with toggle or molly bolts spaced 16″ o.c.

Position studs vertically, engaging floor and ceiling runners, and spaced 24″ o.c. When necessary, splice studs with 8″ nested lap and one positive attachment per stud flange. Place studs in direct contact with all door frame jambs, abutting partitions, partition corners and existing construction elements. Where studs are installed directly against exterior walls and a possibility of water penetration through walls exists, install asphalt felt strips between studs and wall surfaces.

Anchor all studs for shelf-walls and those adjacent to door and window frames, partition intersections, and corners to ceiling and floor runner flanges with USG Metal Lock Fastener tool. Securely anchor studs to jamb and head anchor clips of door or borrowed-light frames by bolt or screw attachment. Over metal door and borrowed-light frames, place horizontally a cut-to-length section of runner, with a web-flange bend at each end, and secure with one positive attachment per flange. Position a cut-to-length stud (extending to ceiling runner) at vertical panel joints over door frame header.

3.2.1 gypsum panel erection

Apply gypsum panels (vertically) (horizontally). Position all edges over studs for vertical application; all ends over studs for horizontal application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.

Screw spacing shown below is for non-rated construction. For fire-rated construction, obtain screw spacing from table, below.

For single-layer vertical application of gypsum panels, space screws 12″ o.c. in field of panels and 8″ o.c. staggered along vertical abutting edges. For horizontal panel application, space screws 12″ o.c. in field and along abutting end joints.

For single-layer adhesive application, pre-bow panels and attach vertically to studs using ⅜″ continuous adhesive beads applied to face of studs. Apply one bead to intermediate studs and two beads to studs occurring at panel joints. Secure panel at top and bottom with 1″ Type S Screws spaced 16″ o.c. Impact panel along each stud to insure good contact at all points.

For double-layer screw attachment, space screws 16″ o.c. for both layers. Apply both layers of gypsum panels vertically with joints in face layer offset from base layer joints. For ⅝″ panels, use 1″ screws for base layer and 1⅝″ screws for face layer. For ½″ panels, use ⅞″ screws for base layer and 1⁵⁄₁₆″ screws for face layer.

For double-layer laminated construction, attach base layer with 1″ Type S Screws spaced 8″ o.c. at joint edges and 12″ o.c. in field. Apply face layer vertically with DURABOND Joint Compound-Taping spread on back side, joints staggered approx. 12″ and fastened to base layer with 1½″ Type G Screws. Drive screws approx. 2′ from ends and 4′ o.c. in field of panel, 1′ from ends and 3′ o.c. along a line 2″ from vertical edges. Temporary shoring or support installed 16″ to 24″ o.c. until adhesive is dry may be used in place of screws.

For double-layer laminated non-rated construction, attach base layer with 1″ Type S Screws spaced 8″ o.c. at joint edges and 12″ o.c. in the field. Apply DURABOND 500 Adhesive in strips to center and along both edges of gypsum face panel. Apply strips with a notched metal spreader having four ¼″x¼″ min. notches spaced max. 2″ o.c. Position wall panels vertically, press into place with firm pressure to insure bond and fasten top and bottom as required. For ceiling panels, space fasteners 16″ o.c. along edges and ends; install one permanent field fastener per framing member at mid-width of panel.

3.2 chase wall erection

Align two parallel rows of floor and ceiling runners spaced apart as detailed. Attach to concrete slabs with concrete stub nails or power-driven anchors 24″ o.c., to suspended ceilings with toggle or molly bolts 16″ o.c., or to wood framing with suitable fasteners 24″ o.c.

Position steel studs vertically in runners, 24″ o.c. with flanges in the same direction, and with studs on opposite sides of chase directly across from each other. Anchor all studs to floor and ceiling runner flanges with USG Metal Lock Fastener tool.

Cut cross bracing to be placed between rows of studs from gypsum panels, 12″ high by chase wall width. Space braces 48″ o.c. vertically and attach to stud webs with six 1″ Type S Screws per brace. If larger braces are used, space screws 8″ o.c. max. on each side.

Bracing of 2½″ steel studs may be used in place of gypsum panels. Anchor web at each end of steel brace to stud web with two ⅜″ pan head screws. When chase wall studs are not opposite, install steel stud cross braces 24″ o.c. hori-

screw locations and spacing—fire-rated steel stud drywall partitions

test number	face layer application			base layer application		
	USG brand screw		spacing and location	USG brand screw		spacing and location
	length	type		length	type	
U of C 6/15/65	1⅝″	S	12″ o.c. to studs at joints and in field, 12″ o.c. to runners	1″	S	12″ o.c. to studs at joints and in field, 12″ o.c. to runners
UL Des U411-2 hr.	1½″	G	adhesive lamination (1) and supplementary screws	1″	S	8″ o.c. to studs at joints, 12″ o.c. to studs in field
UL Des U411-2 hr.	1⅝″	S	16″ o.c. to studs at joints and in field, 12″ o.c. to runners	1″	S	16″ o.c. to studs at joints and in field
UL Des U412-2 hr.	1½″	G	adhesive strip lamination (1) and supplementary screws	1″	S	12″ o.c. to studs at joints and in field
UL Des U412 U of C 9/21/64	1⅝″	S	12″ o.c. to studs at joints and in field	1″	S	12″ o.c. to studs at joints and in field
T-3362 OSU	1″	S	12″ o.c. to studs at joints and runners, 8″ o.c. to studs in field			
T-1174 OSU U of C 7/31/62 GA-WP-45 1 hr.	1″	S	8″ o.c. to studs at joints, 12″ o.c. to studs in field			

(1) Use DURABOND Joint Compound only.

zontally and securely anchor each end to a continuous horizontal 2½″ runner screw-attached to chase wall studs within the cavity.

3.3 drywall soffit erection

Attach steel runners 24″ o.c. to concrete slabs with concrete stub nails or power-driven anchors, to suspended ceilings with toggle bolts or molly bolts or to wood framing with suitable fasteners. On stud walls, space fasteners to engage each stud. On ceilings, place fastener close to outside face runner. Fasten vertical face panel to web of face corner runner and flange of ceiling runner with 1″ Type S Screws spaced 12″ o.c. For braced furring, insert steel studs between face corner runner and sidewall runner and attach alternate studs to runners with USG Metal Lock Fastener tool. Attach bottom face panel to steel studs and runners with 1″ Type S Screws spaced 12″ o.c. Space screws in face corner runner at least 1″ from edge of gypsum panel.

3.4 ceiling installation

3.4.1 grillage erection

Space 8-ga. hanger wires 48″ o.c. along carrying channels and within 6″ of ends of carrying-channel runs. In concrete, anchor hangers by attachment to reinforcing steel, by loops embedded at least 2″ or by approved inserts. For steel construction, wrap hanger around or through beams or joists.

Install 1½″ carrying channels 48″ o.c., and within 6″ of walls. Position channels for proper ceiling height, level, and secure with hanger wire saddle-tied along channel. Provide 1″ clearance between runners and abutting walls and partitions. At channel splices, interlock flanges, overlap ends 12″ and secure each end with double-strand 18-ga. tie wire.

Erect metal furring channels at right angles to 1½″ carrying channels or main support members. Space furring (16″) (24″) o.c. and within 6″ of walls. Provide 1″ clearance between furring ends and abutting walls and partitions. Secure furring to carrying channels with clips or saddle-tie to supports with double-strand 18-ga. tie wire. At splices, nest furring channels at least 8″ and securely wire-tie each end with double-strand 18-ga. tie wire.

At light troffers or any openings that interrupt the carrying or furring channels, install additional cross reinforcing to restore lateral stability of grillage.

3.4.2. steel stud framing system erection

Attach runners at ceiling height, through gypsum panels, to each partition stud with two screws. Insert steel studs in runners and attach each end with one ⅜″ pan head screw. Install 1⅝″ stud cross-bracing over stud framing, space 48″ o.c. and attach to each framing stud with two ⅜″ pan head screws. At hangers, install 12″ long stud section for box reinforcing or lap studs 12″ and secure each end with two ⅜″ pan head screws.

At light troffers or any openings that interrupt the ceiling, install additional cross reinforcing to maintain structural integrity of framing.

3.4.3 gypsum panel erection

Apply gypsum panels of maximum practical length with long dimension at right angles to furring channels. Position end joints over channel web and stagger in adjacent rows.

Fit ends and edges closely, but not forced together. Fasten panels to channels with 1″ Type S Screws spaced 12″ o.c. in field of panels and along abutting ends and edges.

3.5 caged beam fireproofing

Position ceiling runners at least ½″ from and parallel to beam and fasten to floor units with ½″ Type S-12 Pan Head Screws spaced 12″ o.c. Fabricate hanger brackets from 1⅝″ steel runners allowing (½″) (1″) clearance at bottom of beam. Space brackets 24″ o.c. along beam and attach to ceiling runners with ½″ Type S-12 Screws. Install lower corner runners parallel to beam and fasten to brackets with ½″ Type S-12 Screws.

Screw-attach (two) (three) layers of ⅝″ Sheetrock Firecode Gypsum Panels to channel brackets installing vertical panels first, with bottom panels overlapping lower edges of vertical panels in each layer. Attach panels to channel brackets with (1″) (1¼″) Type S Screws 16″ o.c. for base layer, 1⅝″ Type S Screws 12″ o.c. for middle layer and (1⅞″) (2¼″) Type S Screws 8″ o.c. for face layer. For 3-hour assembly, install wire mesh over bottom middle layer panel, extend 1½″ up each side and fasten with 1⅝″ screws used to fasten panels.

3.6 column fireproofing installation

3.6.1 UL Design X518-2 hrs.

Attach inner layer ½″ Sheetrock Firecode "C" Gypsum Panels to 1⅝″ steel studs with 1″ Type S Screws spaced 24″ o.c. and place assembly with gypsum panel next to column flange. Install gypsum panel layer vertically around column using 1″ Type S Screws to attach base layer to stud web 24″ o.c. and face layer to stud flange 12″ o.c. Apply face layer vertically over web face side of column and fasten through base layer to web of studs with 1 5/16″ Type S Screws spaced 12″ o.c. and staggered from screws in base layer. Apply corner bead at all corners, fasten with 1″ Type S Screws 12″ o.c. and finish with joint compound.

3.6.2 UL Designs X521-2 hrs. & X514-3 hrs.

For all W14 x 228 steel columns, provide fire protection with ½″ Sheetrock Firecode "C" Gypsum Panels applied vertically over 1⅝″ steel studs positioned at corners. Attach panels to studs with 1″ Type S Screws spaced 12″ o.c. For 3-hour rating install additional layer over web surface and attach to studs with 1⅝″ Type S Screws spaced 12″ o.c. Apply corner bead at all corners and finish with joint compound.

3.6.3 UL Design X515-3 hrs.

Attach inner layer ½″ Sheetrock Firecode "C" Gypsum Panels to 1⅝″ steel studs with 1″ Type S Screws spaced 12″ o.c. and place assembly with gypsum panel next to column flange. Install two additional layers to stud flange and three additional layers to stud web over web face side of column. Fasten base layers with 1″ Type S Screws, middle layers with 1⅝″ screws and face layers with 2¼″ screws. Space all screws 12″ o.c. vertically. Apply corner bead at corners; finish with joint compound.

3.6.4 UL Design X507-4 hrs.

For all W14 x 228 steel columns, provide fire protection with double-layer ½″ Sheetrock Firecode "C" Gypsum Panels applied vertically over 1⅝″ steel studs positioned at corners. Attach base layer to studs with 1″ Type S Screws spaced 12″ o.c. and attach face layer with 1⅝″ Type S Screws spaced 12″ o.c. and staggered 6″ from base layer screws. Apply corner bead at all corners and finish with joint compound.

3.6.5 UL Design X524-2 hrs.

Provide fire protection to all columns with three layers ½″ Sheetrock Firecode "C" Gypsum Panels screw-attached to 1⅝″ steel studs positioned at column corners. Cut studs ½″ to ¾″ less than column height. For columns having depth of 36″ or less, apply panels vertically and stagger joints between layers at least 30″.

When column depth exceeds 36″, install additional 1⅝″ studs in each web recess inside and along column flanges and at the web center. Set studs in runners placed horizontally, parallel to web between column flanges and spaced max. 8 ft. o.c. vertically. Fasten studs to runners at top and bottom with ½″ Type S-12 Pan Head Screws. Apply gypsum panels horizontally and stagger joints between layers at least 12″.

Attach inner layer of gypsum panels to 1⅝″ steel studs with 1″ Type S Screws spaced 12″ o.c. and place assembly with gypsum panel next to column flange. Install two additional layers to stud flange and three additional layers to stud web over web face side of column. Fasten inner layers with 1″ Type S Screws, middle layers with 1⅝″ Type S Screws, and face layers with 2¼″ type S Screws. Space all screws 12″ o.c. and stagger in adjacent layers.

3.7 wall furring installation

3.7.1 direct furring channel attachment

Attach metal furring channels (vertically) (horizontally), spaced 24″ o.c., to masonry or concrete surfaces with hammer-set or power-driven fasteners or concrete stub nails staggered 24″ o.c. on opposite flanges. Nest channels 8″ at splices and anchor with two fasteners in each wing. Where furring channel is installed directly to exterior wall and a possibility of water penetration through walls exists, install asphalt felt protection strip between furring channel and wall.

3.7.2 bracketed furring channel attachment

Attach adjustable wall furring brackets with serrated edges up, 36″ o.c. horizontally, 48″ o.c. vertically, within 4″ of columns or other abutting construction, within 6″ of floor and ceiling, and as required above and below windows, with (2″ cut nail in mortar joints of brick or clay tile or concrete block, or in field of lightweight aggregate blocks) (⅝″ concrete stub nails or power-driven nails or other suitable fasteners in monolithic concrete). Place fastener in top hole of bracket.

Lay cold-rolled channels horizontally with flanges down, on furring brackets, plumb with other channels, and tie with triple-strand 18-ga. wire; bend down excess bracket length. Erect metal furring channel vertically, spaced 24″ o.c. and tie with triple-strand 18-ga. wire at each junction with cold-rolled channel.

3.7.3 gypsum panel erection

Apply gypsum panels (vertically) (horizontally). Position all edges over furring channels in vertical application; all ends over framing in horizontal application with joints staggered in successive courses. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1″ Type S Screws spaced 12″ o.c.

3.7.4 mechanical application—Z-furring channels

Erect insulation vertically and hold in place with Z-furring channels spaced 24″ o.c. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24″ o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner; start from this furring channel with a 3″ strip of insulation followed by furring channel in the normal manner. At interior corners, space second channel no more than 12″ from corner and cut insulation to fit. Hold insulation in place until gypsum panels are installed with 10″ long staple field-fabricated from 18-ga. tie wire and inserted through slot in channel. Apply wood blocking around window and door openings and as required for attachment and support of fixtures and furnishings.

Apply gypsum panels (vertically) (horizontally) with vertical joints occurring over channels. Attach gypsum panels to channels with 1″ Type S Screws spaced 12″ o.c.

3.8 accessory application

a. Joint System—Finish all face panel joints and internal angles with a U.S.G. Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

b. Laminating Adhesive—Spread to provide ½″ adhesive beads 4½″ o.c. for full sheet lamination. For strip lamination, apply adhesive in vertical strips of four ½″ beads 1½″ to 2″ o.c. Space strips 24″ o.c.

c. Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with 9⁄16″ rosin-coated staples 12″ o.c. on both flanges along entire length of bead.

d. Metal Trim—Where assembly terminates against masonry or other dissimilar material, apply metal trim over panel edge and fasten with screws or 9⁄16″ rosin-coated staples 12″ o.c.

e. P-1 Vinyl Trim—Slip trim over panel with long flange behind panel. Install panel with trim firmly abutting surface.

f. Screws—Power-drive at least ⅜″ from edges or ends of panel to provide uniform dimple 1⁄32″ deep.

g. Control Joints—Break panel behind joint and back by double framing members (and 2″ wide gypsum panel strip). Attach control joint to face layer with 9⁄16″ rosin-coated staples spaced 6″ o.c. on both flanges along entire length of joint.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE, PERF-A-TAPE, DURABOND, DUR-A-BEAD, THERMAFIBER, TEXTONE, MASTICAL, IMPERIAL.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606

direct and resilient attachment **partitions/ceilings/separation walls** **SA 924**

USG Drywall / Wood Frame Systems

system folder

lightweight, quickly erected, fire-rated walls and ceilings with excellent sound attenuation

These basic gypsum drywall assemblies offer economical, quickly erected, load-bearing partitions and ceilings wherever fire protection is desired with wood framing. Excellent sound attenuation at low cost is provided when gypsum panels are resiliently attached. The assemblies are likewise suitable for wall furring and exterior soffit applications. Also designed for wood-frame construction are USG Area Separation Walls, newly developed firewall assemblies for multi-family housing. Variations of the systems meeting special requirements are outlined below:

Single Layer—a basic drywall load-bearing construction suitable where SHEETROCK Gypsum Panels are applied direct to wood framing—either vertically, with long edges parallel to framing, or horizontally with long edges at right angles to framing members. Horizontal application, recommended except in fire-rated partition construction or for predecorated panels, provides greater strength, reduces joint treatment and blocking needed, compensates for uneven framing alignment. Fastening of panels is by four alternate methods:

1. **Standard single nailing**—6″ to 7″ c. to c. spacing for ceilings, 7″ to 8″ for walls.
2. **Double nailing**—for minimizing defects due to loosely nailed panels. First nails spaced 12″ o.c., followed by second nails within 2″ of first.
3. **Screw application**—best known insurance against fastener pops caused by loosely attached panels. 1¼″ USG Brand Type W Screw is used.
4. **Adhesive nail-on**—continuous bead of DURABOND 200 or 300 Adhesive applied to framing plus supplementary nailing; improves bond strength by 50% to 100%, greatly reduces face nailing needed. When DURABOND Vinyl Foam Tape is used, supplementary fasteners are unnecessary.

Two other proven methods upgrade job quality:

Back-Blocking Joint Reinforcement—a method designed to minimize an inherent joint deformation ("ridging") that may occur with adverse job and weather conditions.

Floating Interior Angle System—application of panels to effectively reduce nail pops and angle cracking which may result from stresses at intersections of walls and ceilings.

Double Layer—systems consist of a face layer of SHEETROCK Gypsum Panels job-laminated and/or nailed to base layer of gypsum panels and directly attached to wood framing in walls and ceilings. Because these laminated systems minimize the use of mechanical fasteners in the face layer, finer appearance results—along with greater strength, fire and sound resistance. Adhesive lamination of face layer to base layer, when both are gypsum panels, is by either of two methods: **(a) strip lamination**—DURABOND Joint Compound-Taping or 90 applied in vertical strips 24″ o.c. and supplementary 1½″ USG Brand Type G Screws, or **(b) sheet lamination**—adhesive applied over the entire panel surface with supplementary Type G Screws or temporary supports until adhesive dries.

When a fire rating is not required, contact bonding of face layer with DURABOND Adhesive is preferred. Either DURABOND 500 (notched-spreader applied) or DURABOND 600 (roller-applied) is used with fasteners 16″ o.c. at top and bottom of wall panels and perimeter fasteners 48″ o.c. on ceilings.

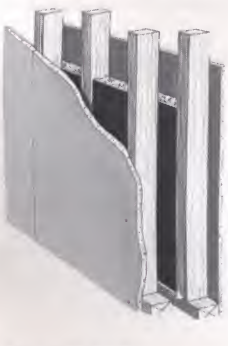
These assemblies are completed with a U.S.G. joint treatment system and decorating—both steps unnecessary in walls, however, when predecorated vinyl-surfaced TEXTONE Gypsum Panels are used.

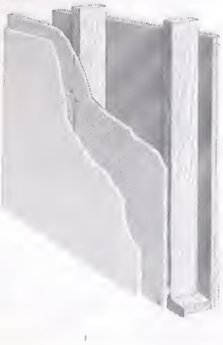
Three alternate framing methods with wood studs spaced 16″ o.c. provide load-bearing assemblies developed to meet fire resistance and sound control requirements in partitions:

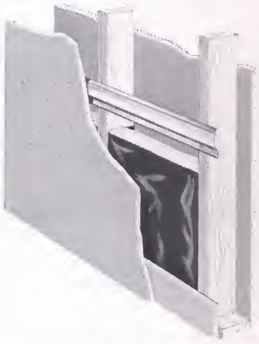
1. Conventional 2x4 stud construction, two layers ⅝″ SHEETROCK FIRECODE Gypsum Panels, or FIRECODE or regular SHEETROCK over base layer of ¼″ SHEETROCK Gypsum Panels. These offer higher sound and/or fire ratings than did the original double wall assembly employing two layers of ⅜″ SHEETROCK.
2. Double row of 2x3 staggered studs set on separate plates 1″ apart, with single layer of ⅝″ SHEETROCK FIRECODE panels and 2″ THERMAFIBER Sound Attenuation Blankets in the cavity. This provides sound isolation of 51 STC where one-hour fire resistance (load bearing) is required. With 2x4 staggered studs on a common 2x6 plate and double layer ⅝″ SHEETROCK FIRECODE "C" Panels, 2-hour fire resistance is obtained.
3. Double row of 2x4 studs set on separate plates 1″ apart, with double layer ⅝″ SHEETROCK FIRECODE "C" offers sound isolation of 51 STC, 2-hour fire resistance and chase space required for party walls in garden apartments. With 3½″ blankets in one cavity, sound attenuation increases to 56 STC.

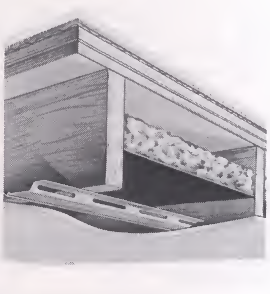
Resilient Attachment—SHEETROCK Gypsum Panels are screw-attached to RC-1 SHEETROCK Resilient Channels, also screw-

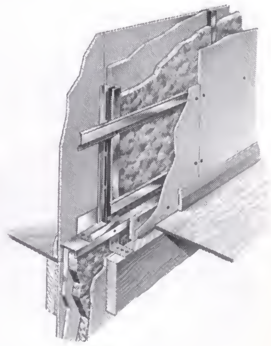
(continued on page 3)


single-layer staggered stud partition


double-layer partition


single-layer resilient partition


single-layer resilient ceiling


cavity-type separation wall

UNITED STATES GYPSUM
1977–1

9P GYPSUM DRYWALL
system—wood frame, 1 & 2-layer

test data/partitions

partition applications

fire rating	description	test no.	stc rating		comments
			11-f	16-f	
45 min.	Wd Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c.—panels nailed 7" o.c.—1⅝" cem ctd nails—joints fin wt 6 width 4⅝"	UL Des U317 (f) (was 1-45 min)			
1 hr.	Wd Stud—Resil ⅝" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" or 24" o.c.—3" THERMAFIBER ins blkts—RC-1 chan one side spaced 24" o.c.—panels att with 1" Type S screws—opp side direct att with 1¼" Type W screws—joints fin—perimeter caulked wt 7 width 5⅜"	UL Des U311 (f) (was 27-1 hr) USG-33-FT-G&H (s)	52		Best value of wood stud drywall party walls
1 hr.	Wd Stud—Resil ⅝" SHEETROCK FIRECODE gypsum panels—2x4 16" o.c.—RC-1 chan both sides spaced horiz 24" o.c. att with 6d nails—panels att with 1" Type S screws—joints fin—perimeter caulked wt 7 width 5⅞"	T-1396-OSU (f) TL-60-52 (s)	45		Fully resilient 1-hr. fire rated party wall
1 hr.	Wd Stud—⅝" SHEETROCK FIRECODE or W/R FIRECODE "C" gypsum panels—2x4 16" or 24" o.c.—panels nailed 7" o.c.—1⅞" cem ctd nails—joints fin—perim caulked wt 7 width 4⅞"	UL Des U305 (f) (was 5-1 hr) UL Des U314 (f) (was 38-1 hr) BBN-700725 (s) USG-30-FT-G&H (s)	34	46	UL Des U314 based on 24" stud spacing BBN test includes 3" insul. blankets USG-30-FT based on 16" stud spacing
1 hr. est	Stag Wd Stud—⅝" SHEETROCK FIRECODE gypsum panels—2x3 16" o.c.—2x3 plates 1" apart—panels att with 1¼" Type W screws 16" o.c.—2" THERMAFIBER sound atten blkts one side—perim caulked wt 8 width 7½"	USG-106-FT-G&H (s) USG-155-FT-G&H (s)	51 49		Best value in 50 stc range for this type of party wall Est. fire rating based on UL Des U305 155-FT based on 2x6 common plate
1 hr. est	Wd Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c.—2 layer—base layer ¼" SHEETROCK gypsum panels appl vert with 4d ctd nails—½" panels face layer strip lamin—joints stag & fin—perimeter caulked wt 8 width 5⅛"	USG-221-ST-G&H (s) TL-69-52 (s)		53 45	Est. fire rating based on UL Des U305 221-ST based on ⅝" lamin. face layers & 1½" THERMAFIBER sound atten. blankets
1 hr. est	Stag Wd Stud—⅝" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c. on 2x6 com plate—panels att with 6d ctd nails 7" o.c.—2" THERMAFIBER sound atten blkts one side—perim caulked—joints fin wt 8 width 6⅞"	TL-69-213 (s)		45	Est. fire rating based on UL Des U305
1 hr.	Wd Stud—2 layers ⅜" SHEETROCK gypsum panels lamin & nailed—2x4 16" o.c.—joints fin wt 7 width 5⅛"	T-118-48-OSU (f) TL-57-14 (s)	38		
1 hr. est	Wd Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2x4 16" o.c.—3" THERMAFIBER ins blkts—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—joints fin wt 12 width 6⅛"	TL-67-239 (s) TL-67-212 (s)		59 49	Exceptional sound control for party walls Est. fire rating based on UL Des U311 TL-67-212 based on same construction without blankets
2 hrs.	Wd Stud—2 layers ⅝" SHEETROCK FIRECODE "C" gypsum panels ea side—2x4 16" o.c.—2" THERMAFIBER sound atten blkts—RC-1 chan one side spaced 24" o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—joints fin wt 13 width 6⅝"	T-4799-OSU (f)			
2 hrs.	Wd Stud—2 layers ⅝" SHEETROCK FIRECODE or W/R FIRECODE "C" gypsum panels—2x4 16" o.c.—base layer 6d nails 6" o.c.—face layer lamin or nailed to base—joints fin wt 12 width 6⅛"	UL Des U301 (f) (was 4-2 hr)	N/A		Basic 2-hour partition construction
2 hrs. est	Wd Stud—2 layers ⅝" SHEETROCK FIRECODE "C" gypsum panels—2 rows 2x4 16" o.c. on sep plates 1" apart—base layer att with 6d ctd nails 16" o.c.—face layer att with 7d ctd nails 7" o.c.—perim caulked—joints fin wt 13 width 10¾"	USG-710120 (s) TL-69-214 (s)		56 51	Est. fire rating based on UL Des U301 USG-710120 based on 3½" thick blankets in one cavity
2 hrs. est	Stag Wd Stud—2 layers ⅝" SHEETROCK FIRECODE "C" gypsum panels—2x4 16" o.c. on 2x6 com plate—base layer att with 6d ctd nails 6" o.c.—face layer att with 8d ctd nails 8" o.c.—perim caulked—joints fin wt 13 width 8⅛"	TL-69-211 (s)		47	Est. fire rating based on UL Des U301

NOTE: Partition width based on 3⅝" stud width.

wall furring applications

—	RC-1 Resilient Channels 24" o.c.—½" Foil-Back SHEETROCK gypsum panels screw attached—joints finished	—	—	—	RC-1 channel reduces transfer of structural stresses to surface
—	Wood furring strips 16" o.c.—½" Foil-Back SHEETROCK gypsum panels—joints finished	—	—	—	Surface not isolated from structural stresses

For ceiling applications, see page 6; for area separation walls, see page 9.

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description/technical data

(continued from page 1)

attached 24″ o.c. to the framing. The galvanized steel channels "float" the panels away from the framing; provide a spring action that isolates the gypsum panel surface. These systems combine highly effective sound isolation with lightweight low-cost construction.

An excellent value in wood frame party walls consists of single-layer ⅝″ Sheetrock Firecode Gypsum Panels, resiliently attached to one side of studs and directly attached to the other side, plus 3″ Thermafiber Insulating Blankets pressed tightly into the stud cavity. This lightweight partition is widely used for its high sound value, STC 52, at costs which are little more than for conventional partition systems. It also offers 1-hour rated fire resistance; often chosen for use between units in garden apartments and other buildings.

Where exceptional sound control, greater fire resistance and strength are required, double-layer drywall construction is used with Thermafiber Blankets and RC-1 channels applied one side of wood studs (see table, page 2).

Area Separation Walls—fast-erecting non-load bearing drywall partitions for low-cost fire barriers in wood-frame multi-family housing (see page 9).

Wall Furring—Foil-Back Sheetrock Gypsum Panels provide an economical, efficient vapor barrier and a readily decorated interior surface for exterior walls. Panels are attached to wood furring strips 16″ o.c. or screw-attached to RC-1 Sheetrock Resilient Channels 24″ o.c. The resilient channels reduce the transfer of structural stresses to the gypsum panel wall surface.

Gypsum panels for these assemblies are available in five thicknesses and nine types. Sheetrock Firecode Panels, with a specially formulated core, obtain higher fire-resistance ratings than regular Sheetrock Panels. Sheetrock W/R (water-resistant) Panels are an ideal tile base for tub and shower areas. Exterior Gypsum Ceiling Board offers superior sag and water resistance plus excellent paintability in exterior soffits. Lightweight Pyrorock Sound Underlayment Board provides high performance and dry installation over plywood subfloors in multi-family dwellings.

Sheetrock Panels are easily screw-applied to channel-type galvanized steel studs. See U.S.G. folders for details: SA-923 on non-load bearing assemblies and CS-4 on load-bearing construction.

limitations

1. Maximum frame spacing:

Double layer: 16″ o.c. if fire rating is required, also for ceilings with ⅜″ base layer; 24″ for ceilings with ½″ base layer applied with long dimension applied across framing, also for all double-layer sidewalls if fire rating of one hour or more is not required.

Single layer: ceilings—16″ o.c. for ⅜″ Sheetrock applied across the framing, application not recommended with long edge parallel to framing; 16″ o.c. for ½″ and ⅝″ thick panels with long edge parallel to framing; 24″ o.c. for other applications, except see Note 2 below. Sidewalls—⅜″ Sheetrock Panels, 16″ o.c.; ½″ and ⅝″ Sheetrock, 24″ o.c.

Resilient channel: ceilings—24″ o.c. for joists 16″ o.c.; 16″ o.c. for joists 24″ o.c. Sidewalls—24″ o.c.

2. For single-layer panels used as base for spray-applied texture finish, maximum frame spacing is 16″ o.c. for ½″ thick panels applied across framing; application of panels with long edges parallel to framing and ⅜″ thick panels are not recommended.

3. USG Brand Type S Screws must be used for attachment of single-layer panels to RC-1 Resilient Channels.

4. RC-1 Resilient Channels must be attached to the bottom face of wood floor joists with 1¼″ USG Brand Type W or 1″ Type S Screws. Nails must not be used. For fire-rated construction, use 1¼″ Screws, Type S or W.

5. Resilient ceilings should not be installed beneath highly flexible floor joists. Install only to framing meeting "Wood Framing Requirements" shown in U.S.G. Gypsum Panels Product Folder SA-927.

6. Direct attachment to wood framing with fastener penetration into wood exceeding 1″ is not recommended except where required to meet fire rating.

7. Not recommended for exterior soffits and ceilings which project upwards and away from the building proper.

8. Sheetrock Panels are not recommended where exposure to moisture is extreme or continuous. Specially formulated Sheetrock W/R Panels are recommended as a base for wall tile in bathrooms and other high-moisture areas.

thermal resistance (R) values—Foil-Back Sheetrock Panels (1)

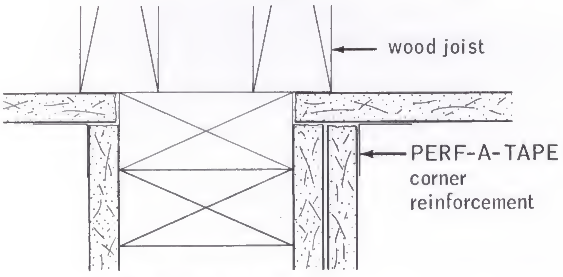
thickness	½″	⅝″
wall application	3.93	4.03
ceiling application		
summer conditions	4.94	5.04
winter conditions	2.73	2.83

(1) Resistance based on inside still air film, panel thickness and one reflective surface facing a ¾″ min. still air space.

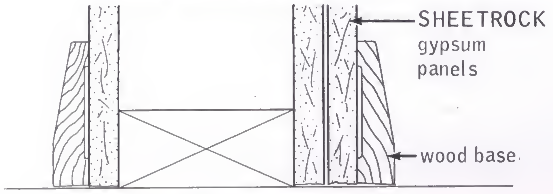
sound transmission loss—db

test no.	method	band center frequency—Hz																			STC
		125	160	175	200	250	315	350	400	500	630	700	800	1000	1250	1400	1600	2000	2500	2800	3150	4000	
TL-67-239	Lab	35	41	—	47	53	56	—	57	59	60	—	61	63	64	—	65	65	64	—	59	61	59
USG-710120	Field	43	40	—	46	49	48	—	49	51	54	—	56	59	60	—	64	66	66	—	65	71	56
USG-221-ST-G&H	Lab	30	37	—	42	47	48	—	48	48	51	—	55	57	58	—	59	59	57	—	59	62	53
USG-33-FT-G&H	Lab	32	—	36	—	42	—	46	—	52	—	54	—	58	—	55	—	53	—	53	—	54	52
USG-106-FT-G&H	Lab	28	—	39	—	43	—	47	—	53	—	57	—	60	—	64	—	59	—	60	—	65	51
TL-69-214	Lab	31	35	—	34	39	44	—	48	51	53	—	56	56	59	—	57	50	53	—	59	59	51
USG-155-FT-G&H	Lab	26	—	34	—	44	—	47	—	50	—	52	—	53	—	57	—	58	—	55	—	60	49
TL-67-212	Lab	26	30	—	33	39	42	—	47	49	52	—	55	57	60	—	61	61	58	—	53	56	49
TL-69-211	Lab	30	33	—	35	40	40	—	42	44	46	—	49	51	52	—	52	48	48	—	53	57	47
BBN-700725	Lab	31	31	—	36	38	39	—	41	42	46	—	49	51	52	—	54	49	45	—	48	52	46
TL-60-52	Lab	29.5	—	32.5	—	39.5	—	43.5	—	46	—	48	—	50	—	51	—	49	—	44	—	49	45
TL-69-52	Lab	21	28	—	34	35	39	—	41	41	46	—	49	51	54	—	56	55	53	—	52	55	45
TL-69-213	Lab	25	31	—	35	37	41	—	40	40	43	—	46	46	51	—	51	47	47	—	51	54	45
USG-30-FT-G&H	Lab	17	—	16	—	34	—	30	—	35	—	40	—	42	—	45	—	38	—	39	—	44	34

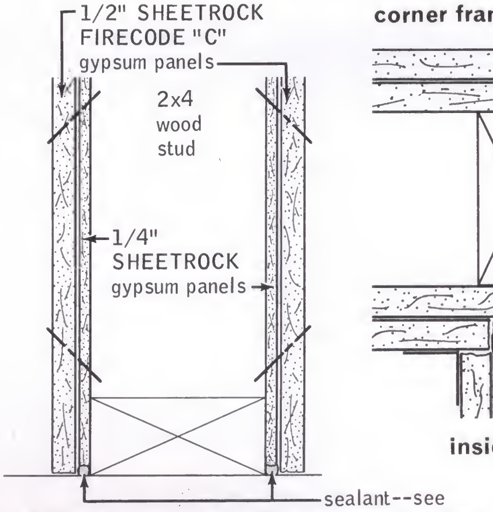
details/partitions



ceiling attachment

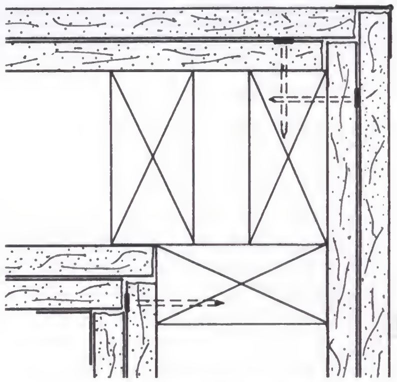


floor attachment



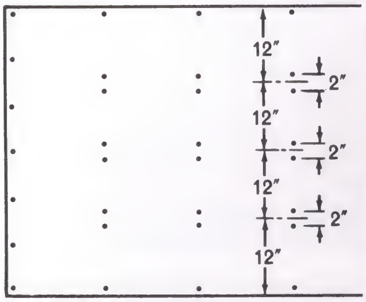
sound-isolating partition
test TL—69—52: 45—STC

corner framing details

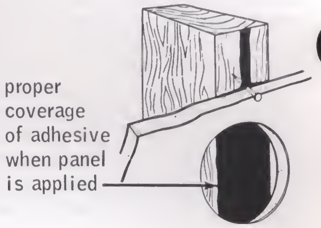


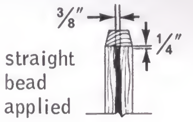
inside/outside corner

double nailing application

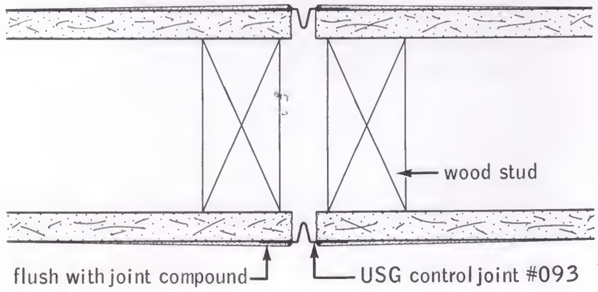


adhesive nail-on application



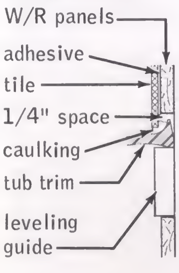


wall control joint

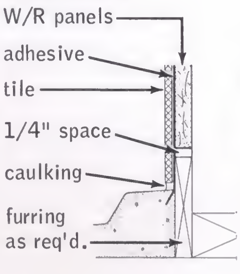


tub and shower details—SHEETROCK W/R Panels

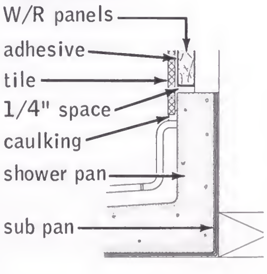
single-layer panels



tub

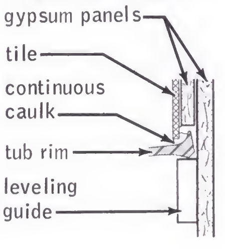


shower receptor

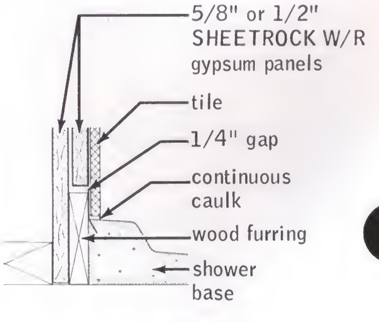


shower pan

double-layer panels



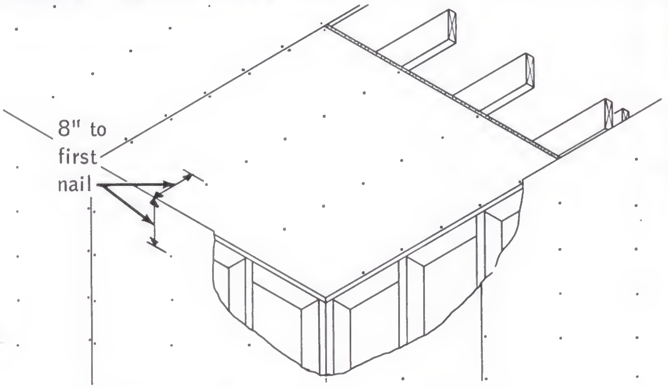
tub



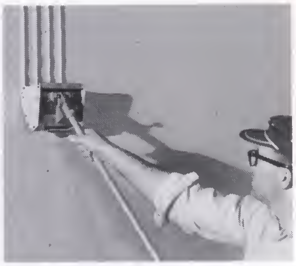
shower receptor

details/partitions

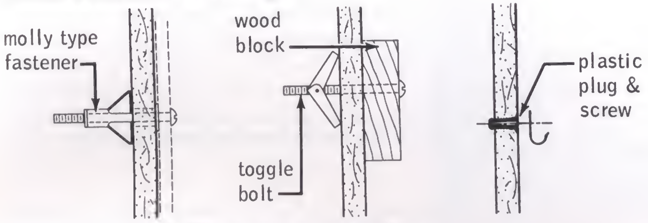
floating interior angle system



sheet lamination


strip lamination

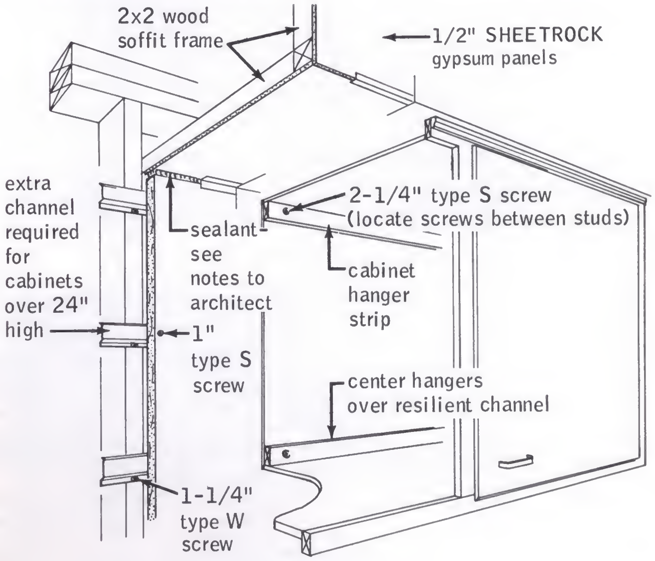
fixture attachments—light



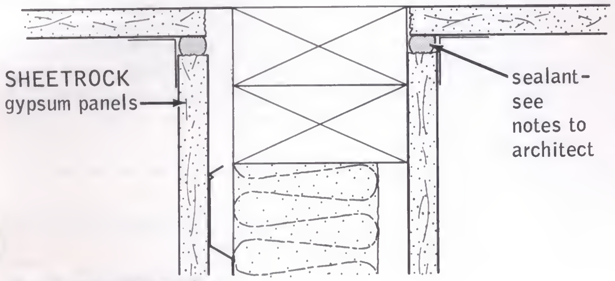
fastener load data

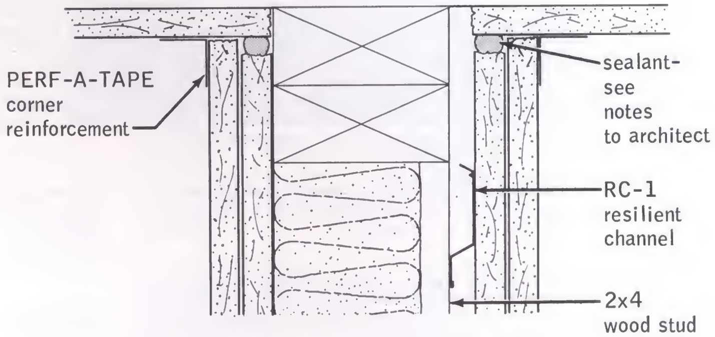
type fastener or attachment	allowable withdrawal resistance—lb.	allowable shear resistance—lb.
¼" molly bolt into ½" SHEETROCK Panels only	35	80
¼" toggle bolt into ½" SHEETROCK Panels only	40	60
No. 8 sheet metal screw in plastic plug	20	40

cabinet attachment

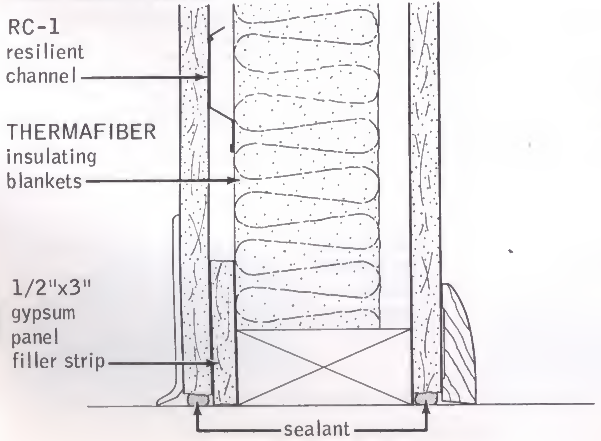

2x2 wood soffit frame
1/2" SHEETROCK gypsum panels
extra channel required for cabinets over 24" high
sealant-see notes to architect
2-1/4" type S screw (locate screws between studs)
cabinet hanger strip
1" type S screw
center hangers over resilient channel
1-1/4" type W screw

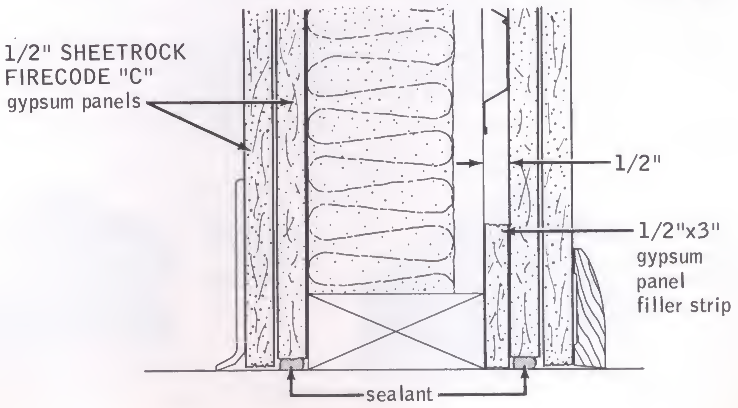
ceiling attachments




PERF-A-TAPE corner reinforcement
sealant-see notes to architect
RC-1 resilient channel
2x4 wood stud

floor attachments


RC-1 resilient channel
THERMAFIBER insulating blankets
1/2"x3" gypsum panel filler strip
sealant

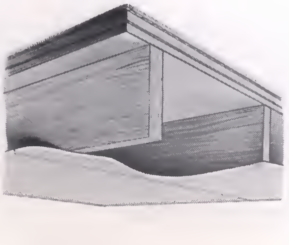

1/2" SHEETROCK FIRECODE "C" gypsum panels
1/2"
1/2"x3" gypsum panel filler strip
sealant

test data/ceilings

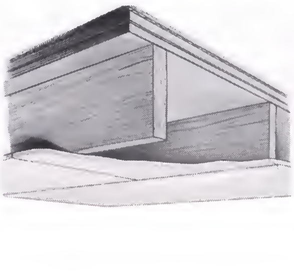
fire rating	description	test no.	sound rating		comments
			STC	IIC	
1 hr.	½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin clg wt 3	UL Des L512 (f) (was 42-1 hr) NBS-77 P-716 (s)	36†		Basic assembly—sound attenuation test
1 hr.	Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom plywd & MASTICAL underlayment compd or wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L514 (f) (was 41-1 hr) BBN-670601 (s) BBN-670602 (s)	56	54	Sound ratings based on ¾" MASTICAL ⅝" plywood subfloor and 3" insulating blankets
1 hr.	Resil ⅝" SHEETROCK FIRECODE "C" gypsum panel ceiling—¾" PYROROCK underlayment bd over ⅝" plywd subflr—(1) ⅛" vinyl flr tile (2) 66-oz carpet & 40-oz pad—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L523 (f) BBN-740307 (s) (1) USG-740302 (s) (2) USG-740308 (s)	49	45 58	Fire rating also applies with direct-attached gypsum panel ceiling USG-740302 based on ½" thick gypsum panels
1 hr. est	Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—¾" PYROROCK underlayment bd over ⅝" plywd subflr—(1) ⅛" vinyl flr tile (2) 66-oz carpet & 40-oz pad—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	BBN-720503 (s) (1) BBN-720502 (s) (2) BBN-720501 (s)	55	52 64	Est. fire rating based on UL Des L514
1 hr.	Resil ⅝" SHEETROCK FIRECODE "C" gypsum panel ceiling—1⅝" perlite-sand conc over ⅝" plywd subfloor—2x10 wd joist 16" o.c.—3" glass fiber batts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L516 (f) (was 62-1 hr)	N/A		
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-6 (s) (½" FIRECODE "C") CK-6412-10 (s) (⅝" reg SHEETROCK)	47 47	39 39	Est. fire rating based on UL Des L514
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-7 (s) (½" FIRECODE "C") CK-6412-9 (s) (⅝" reg SHEETROCK)	47 48	67 66	Est. fire rating based on UL Des L514
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-9 (s) (½" FIRECODE "C") CK-6412-3 (s) (⅝" reg SHEETROCK)	51 50	46 46	Est. fire rating based on UL Des L514
1 hr. est	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists — RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin clg wt 3	CK-6512-8 (s) (½" FIRECODE "C") CK-6412-4 (s) (⅝" reg SHEETROCK)	52 51	71 70	Est. fire rating based on UL Des L514
1 hr.	½" SHEETROCK FIRECODE "C" gypsum panel ceiling—½" plywd & ¾" MASTICAL underlayment compd over subflr—2x10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin clg wt 3	UL Des L512 (f) (was 42-1 hr) BBN-671007 & 671008 (s)	48	35	BBN-671007 & 671008 based on 1¼" thick MASTICAL floor underlayment
1 hr.	⅝" SHEETROCK FIRECODE gypsum panel ceiling—Amer Plywood Assn 2-4-1 flr 4x10 wd joist 48" o.c.—USG met fur chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin clg wt 3	UL Des L508 (f) (was 28-1 hr)	N/A		Only 1-hr. residential drywall system based on 48" joist spacing
1 hr.	⅝" SHEETROCK FIRECODE gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—panels att with 6d nails 6" o.c.—joints fin clg wt 3	UL Des L501 (f) (was 1-1 hr) CK-6412-7 (s) CK-6412-8 (s)	38 39	32 56	In CK-6412-8 test, 44-oz. carpet & 40-oz. pad added atop flooring
1 hr. est	⅝" SHEETROCK gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—panels att with 6d nails 6" o.c.—joints fin clg wt 3	CK-6412-6 (s) CK-6412-5 (s)	41 40	32 58	Est. fire rating based on UL Des L501 In CK-6412-5 test, 44-oz. carpet & 40-oz. pad added atop flooring
2 hrs.	Resil 2 layers ⅝" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c. screw att over base layer panels—face layer screw att to chan 12" o.c.—joints fin clg wt 5	UL Des L511 (f) (was 272-2 hr)			Fire rating 1½ hr. based on same construction with ½" thick gypsum panels—UL Des L510 (f)

†Based on 11-freq.

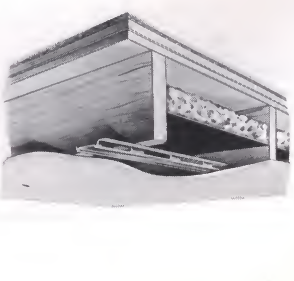
single-layer ceiling



double-layer ceiling



resilient channel with blankets



description/ceilings

In single-layer ceiling assemblies, Sheetrock Gypsum Panels are applied across the supports and fastened with nails or screws. Nails are spaced 6″ to 7″ o.c. (6″ for fire-rated construction); 1¼″ USG Brand Type W Screws are spaced 12″ o.c. Where no fire rating is required, adhesive nail-on fastening improves bond strength and reduces face nailing (see page 4 for details).

Resilient channel systems offer fire-resistant wood joist floor/ceiling assemblies having highly efficient sound isolation at low cost—qualities particularly needed in apartments, motels and other multi-family buildings. RC-1 Sheetrock Resilient Channels are screw-attached across wood joists; gypsum panels are attached to channels with USG Brand Type S Screws. A one-hour fire rating is available with ½″ Sheetrock Firecode "C" Gypsum Panels. With a double-layer ⅝″ Sheetrock Firecode "C" Panels separated by RC-1 Resilient Channels, a 2-hour rating is provided. When 3″ Thermafiber Insulating Blankets are installed between joists, airborne and impact sound ratings are greatly improved (see table, left).

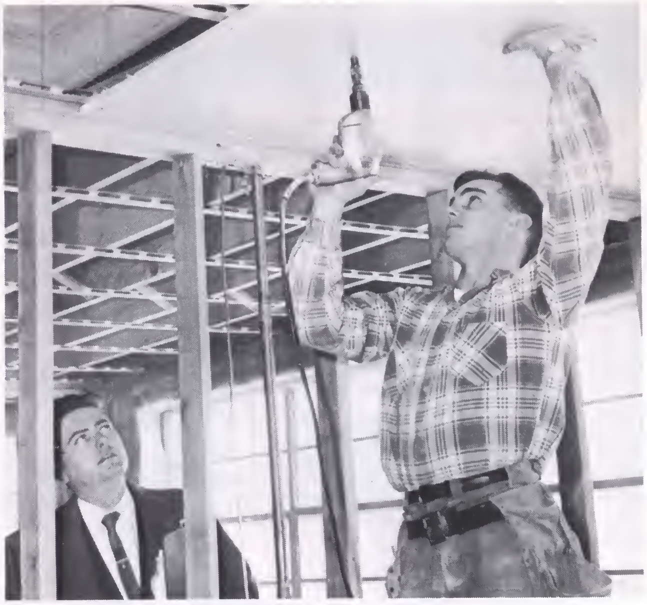
Floor/ceiling sound resistance is improved by using underlayment compound or special gypsum board over plywood subfloor. Mastical is a super-strength gypsum underlayment compound which is poured in place over plywood and troweled smooth. Pyrorock Sound Underlayment Board, a specially formulated square-edge gypsum board, is nail-attached for completely dry floor construction. These underlayments produce a durable surface suitable for finishing with carpet and pad, resilient tile or wood parquet. With either directly or resiliently attached gypsum panel ceilings, these structural subfloor systems also provide excellent fire resistance which makes them suited for motels and multi-story apartments (for details and specifications, see U.S.G. Bulletins IR-165 for Mastical, IR-552 for Pyrorock).

Sheetrock Panels are easily screw-applied to channel-type USG Steel Joists. See U.S.G. Folder CS-4 for details.

Exterior Soffits—eaves, canopies and carports and other exterior soffit applications with indirect exposure to the weather are quickly and economically completed with USG Exterior Gypsum Ceiling Board fastened directly to joists (see U.S.G. Bulletin WB-1152 for detailed specification).

Radiant Heated Ceilings—specially formulated components are also used extensively in electric cable radiant heated ceilings. A single layer of USG R.H. Base, attached to joists, provides a base for electric radiant heat cable and following ¼″ thickness of Sheetrock R.H. Filler. This special system allows higher cable temperatures than with other gypsum products, provides more efficient heat transmission and greater resistance to heat deterioration. See U.S.G. Bulletin P-480.

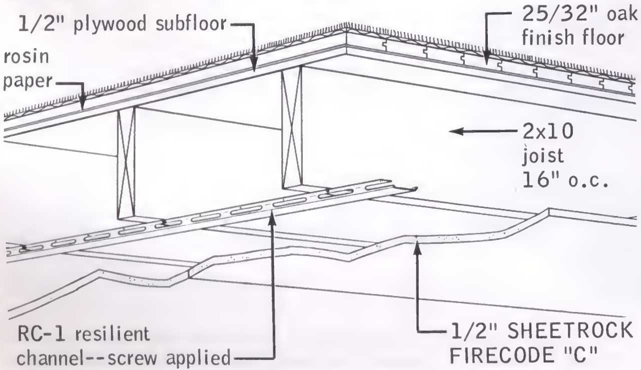
Maximum frame spacing and other limitations for these systems are shown on page 3.



resilient ceiling application

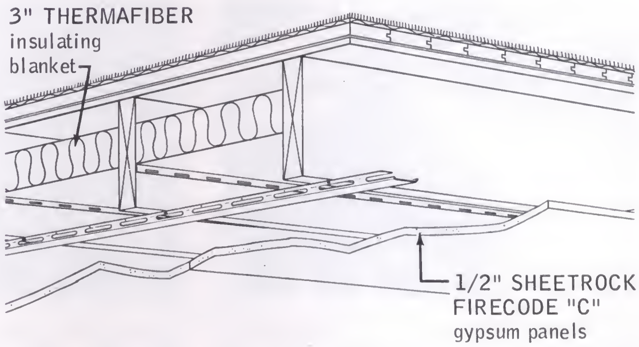
direct ceiling application

ceiling and floor assemblies


1/2" plywood subfloor
25/32" oak finish floor
rosin paper
2x10 joist 16" o.c.
RC-1 resilient channel--screw applied
1/2" SHEETROCK FIRECODE "C" gypsum panels

test CK-6512-7

test CK-6512-6—same but without carpet & pad


3" THERMAFIBER insulating blanket
1/2" SHEETROCK FIRECODE "C" gypsum panels

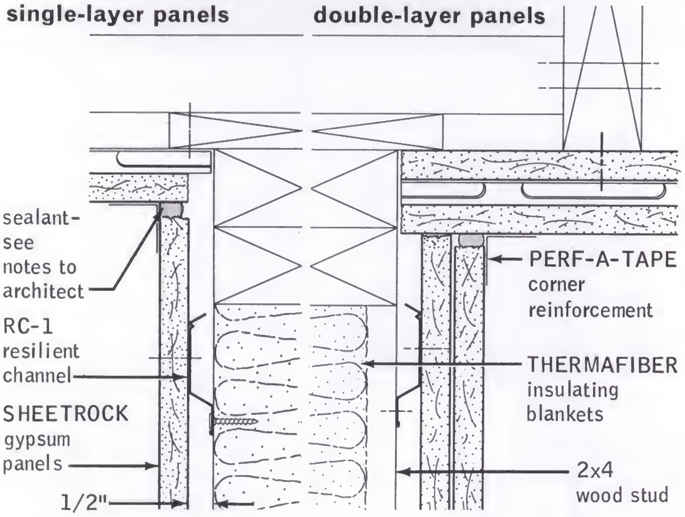
test CK-6512-8

test CK-6512-9—same but without carpet & pad

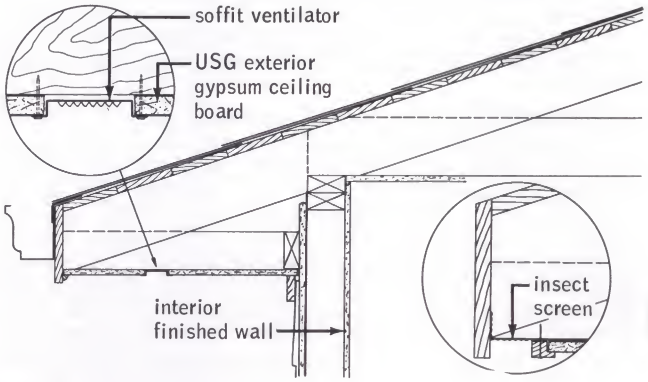
details/ceilings

single-layer panels

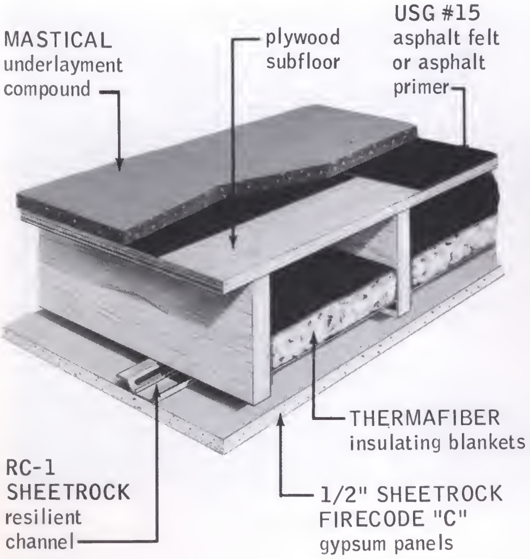
double-layer panels



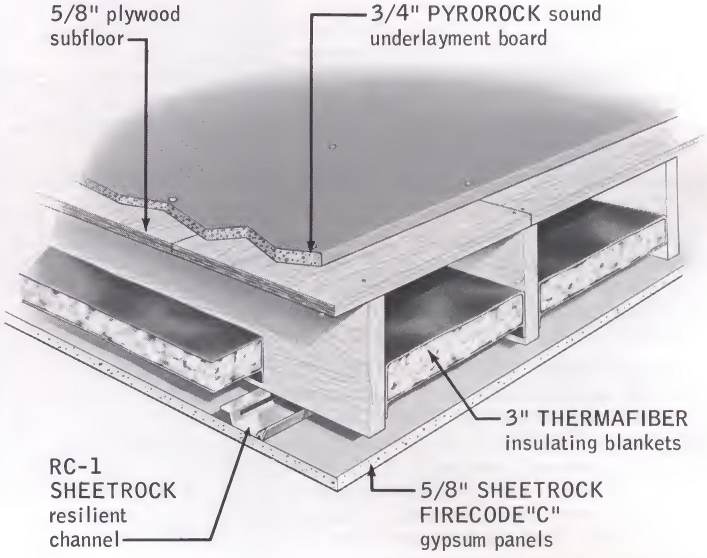
exterior soffit



underlayment compound application



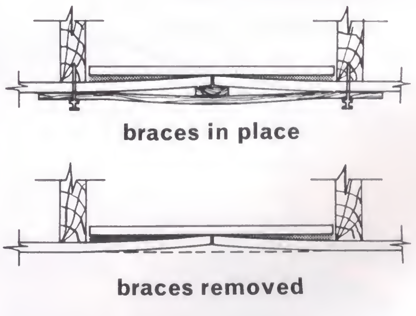
underlayment board application



back-blocking procedure

A. Gypsum panels are applied with long edges at right angles to joists. Backing blocks 8″ wide, cut from scrap panels, are cemented and placed along full length of edge and ends of panels. Floating of end joints compensates for a twisted stud or joist.

B. Immediately after all blocks are in place, the next panel, which had been previously cut, is erected. Ends are loosely butted.



C. Cross section shows how floated end joint is tapered and back-blocked. Brace is temporarily nailed over wood strip (top drawing) which depresses ends of panels. When strips are removed, tapered formation remains as shown at bottom.

area separation walls

fire rating	description	test no.		stc rating		comments
				11-f	16-f	
2 hrs.	Cavity Area Separation Wall—½″ SHEETROCK W/R FIRECODE "C" gypsum panels—1″ USG gypsum liner panels set betw USG stl C-H studs 24″ o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked wt 9 width 3½″	U of C 6-23-75 BBN-750704	(f) (s)		47	BBN-750704 based on 1″ THERMAFIBER sound atten. blankets in cavity
2 hrs. est	Cavity Area Separation Wall—½″ SHEETROCK W/R FIRECODE "C" gypsum panels—1″ USG gypsum liner panels set betw USG stl C-H studs 24″ o.c.—RC-1 chan 24″ o.c. screw att to side opp liner panels—1½″ THERMAFIBER sound atten blkts—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked wt 10 width 4″	BBN-750411	(s)		50	Est. fire rating based on U of C 6-23-75
2 hrs. est	Solid Area Separation Wall—⅝″ SHEETROCK FIRECODE "C" gypsum panels—two 1″ gypsum liner panels set betw USG stl H-studs 24″ o.c.—2x3 16″ o.c. ea side on 2x3 plates 1″ from liner panels—gypsum panels att with 1¼″ Type W screws 12″ o.c.—joints stag & fin—perim caulked wt 16 width 10¼″	BBN-730104 BBN-730103 BBN-730102	(s) (s) (s)		45 54 57	Est. fire rating based on T-4481-OSU BBN-730103 based on 2″ THERMAFIBER insulating blankets in one cavity. BBN-730102 based on 2″ THERMAFIBER insulating blankets in both cavities
3 hrs. est	Cavity Area Separation Wall—⅝″ SHEETROCK W/R FIRECODE "C" gypsum panels—1″ USG gypsum liner panels set betw USG stl C-H studs 24″ o.c.—RC-1 chan 24″ o.c. screw att to side opp liner panels—1½″ THERMAFIBER sound atten blkts—single layer panels one side appl vert & screw att—2 layers opp side screw att to chan—base layer appl horiz—face layer appl vert—joints fin—perim caulked wt 14 width 4⅞″	BBN-730622	(s)		57	Est. fire rating based on U of C 2-16-72

description

USG Area Separation Walls are remarkable developments for constructing common walls with fire-resistive protection for adjacent properties. These lightweight, non-load bearing gypsum drywall assemblies are designed as vertical fire barriers separating occupancies in wood-frame apartments and townhouses. They are the essence of simplicity—large-size gypsum panels attached to steel studs and runners quickly become thin, space-saving walls offering remarkable acoustical privacy. Their engineered performance and low labor and material costs make these systems superior to the usual masonry construction.

Available in two basic systems both providing fire-resistant walls from ground level to roof:

Cavity Type, with integral interior gypsum panel surfaces for commonly shared party walls between apartments.

Solid Type, with separately framed interior gypsum panel surfaces both sides of fire barrier; slightly higher cost.

Cavity-Type Wall consists of steel C-H Studs and gypsum liner panels set in steel runners and faced both sides with SHEETROCK W/R FIRECODE "C" Gypsum Panels. Liner panels, 1″ thick, are erected vertically with ends set into 2½″ USG J-Runners and edges inserted into specially formed 2½″ USG Steel C-H Studs screw-attached to runners. J-runners are installed singly at top and bottom of wall and back-to-back between vertical liner panels on a line 3″ above each intermediate floor. Aluminum clips, which attach the studs to adjacent wood framing, break away when exposed to fire, thus permitting a fire-damaged structure to fail while the fire barrier remains intact. To improve sound transmission loss, THERMAFIBER Sound Attenuation Blankets are inserted in the stud cavity and RC-1 SHEETROCK Resilient Channels may be used to isolate the face layer. With 212CH5 steel studs spaced 24″ o.c., the assemblies are suitable for floor-to-ceiling heights up to 11 ft. under 5-psf lateral load and up to 8 ft. as exterior walls under 15 psf wind load without exceeding 1/240 allowable deflection.

Solid-Type Wall consists of two 1″ thick gypsum liner panels installed vertically between 2″ USG Steel J-Runners. Panel edges are inserted in 2″ USG Steel H-Studs spaced 24″ o.c. and screw-attached to runners. J-runners are installed at top and bottom of wall and back-to-back between vertical panels at a convenient height above each intermediate floor. Back-to-back horizontal runners are attached to wood framing with 16-ga. aluminum angle clips which break away in the same fashion as with cavity-type walls. With 24-ga. steel H-studs, the assembly is suitable for floor-to-ceiling heights up to 10 ft. without exceeding 1/240 allowable deflection under 5-psf lateral load.

Components used in these systems are designed to permit temporary exposure to inclement weather during construction. Moisture-resistant paper facings on USG Gypsum Liner Panels shed water, protect the special fire-resistant core. Runners and studs are hot-dipped galvanized steel. The THERMAFIBER Sound Attenuation Blankets are wrapped in vinyl film. SHEETROCK W/R FIRECODE "C" Panels, ½″ or ⅝″ thick, have a water-resistant gypsum core and multi-layered paper chemically treated to combat moisture penetration.

Construction using the breakaway aluminum clip is covered by U.S. Patent No. 3,974,607.

function and utility

These systems may be used in buildings up to four stories high and with all common floor-ceiling heights found in multi-family housing. Both cavity and solid types are suitable for exterior walls with appropriate weather-resistant facing when offset sloping roofs are desired; also for use with flat decks of wood or poured gypsum concrete.

Fire Resistance—Both types of USG Area Separation Walls offer 2-hr. fire ratings; the cavity type also offers a 3-hr. rating (see table above).

Sound Isolation—STC ratings up to 57 are available in both types (see table above).

Lightweight—These drywall assemblies weigh at least 50% less than masonry walls usually used. Their light weight speeds installation.

Space-Saving—Use of these assemblies gains valuable floor space. Thickness is 3½″ to 4″ for Cavity Type Walls, compared to 8″ to 12″ for a masonry wall without interior finish.

Weather Resistance—Moisture-resistant components permit installation in any weather men can work—eliminate many costly winter construction delays.

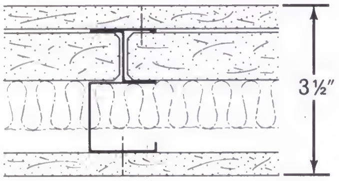
limitations

Non-load bearing; max. frame spacing: 24″.

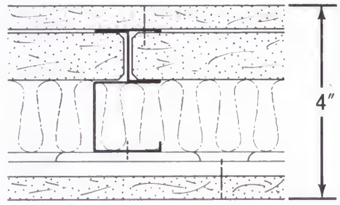
area separation walls

rated assemblies

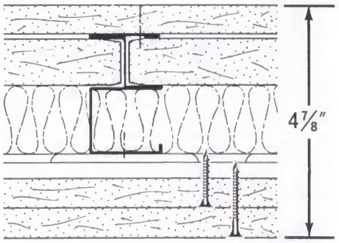
cavity walls



2 Hrs. est. based on U of C 6-23-75
47 STC—BBN-750704

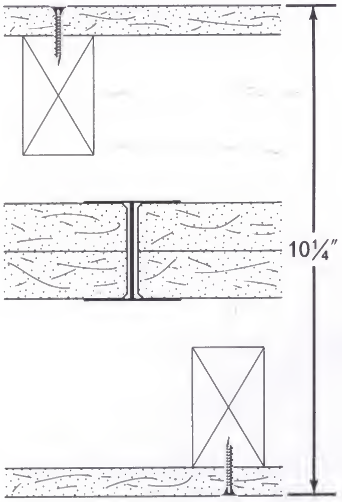


2 Hrs. est. based on U of C 6-23-75
50 STC—BBN-750411

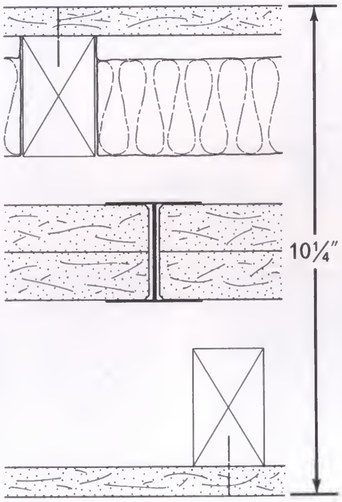


3 Hrs. est. based on U of C 2-16-72
57 STC—BBN-730622

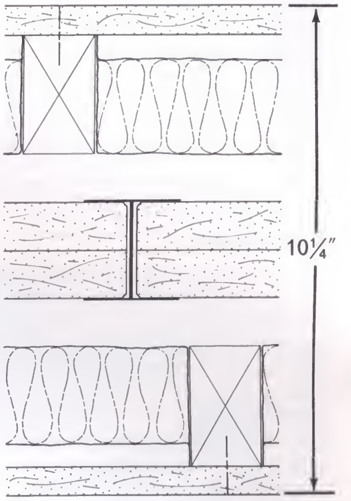
solid walls



2 Hrs. est. based on T-4481-OSU
45 STC—BBN-730104—no blkts.

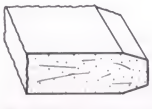


2 Hrs. est. based on T-4481-OSU
54 STC—BBN-730103—blkts. 1 side

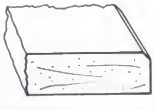


2 Hrs. est. based on T-4481-OSU
57 STC—BBN-730102—blkts. 2 sides

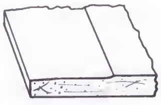
components



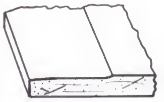
1″ USG gypsum liner panel (C-H stud)



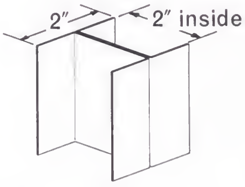
1″ USG gypsum liner panel (H-stud)



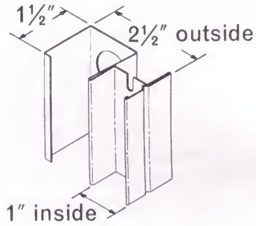
SHEETROCK W/R FIRECODE "C" gypsum panel



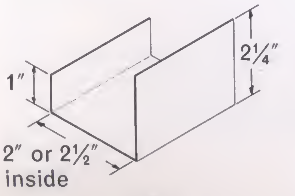
SHEETROCK FIRECODE "C" gypsum panel



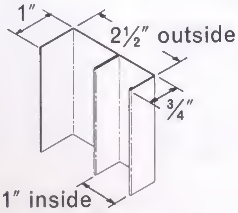
USG
steel H-stud



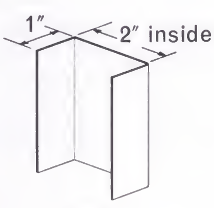
USG
steel C-H stud



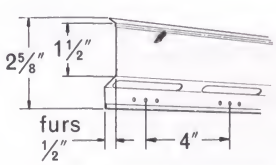
USG
steel J-runner



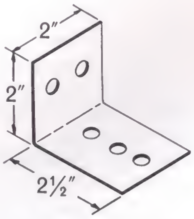
USG
steel E-stud



USG
steel C-stud

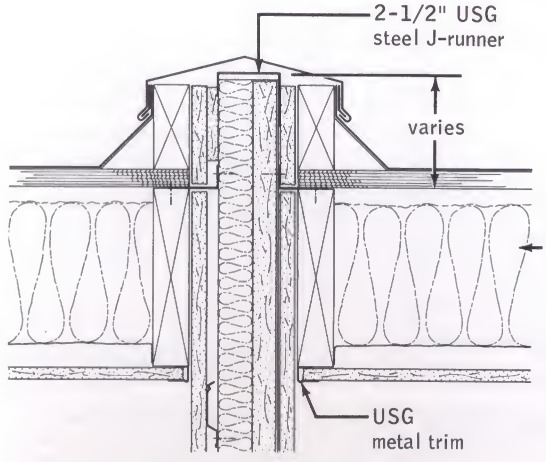


RC-1 SHEETROCK
resilient channel

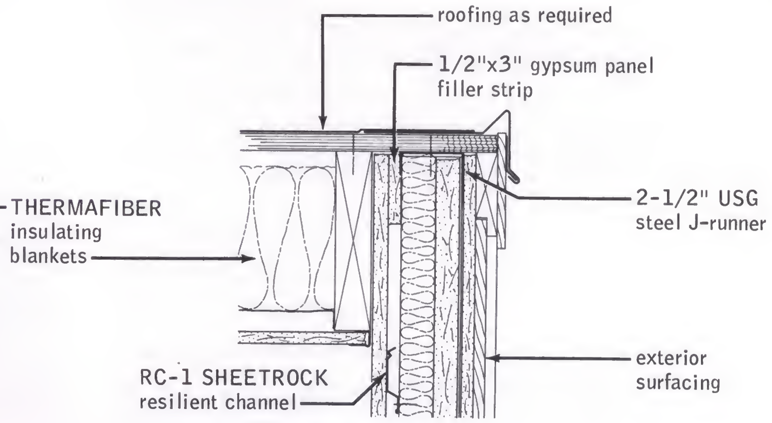


16-ga. aluminum clip angle

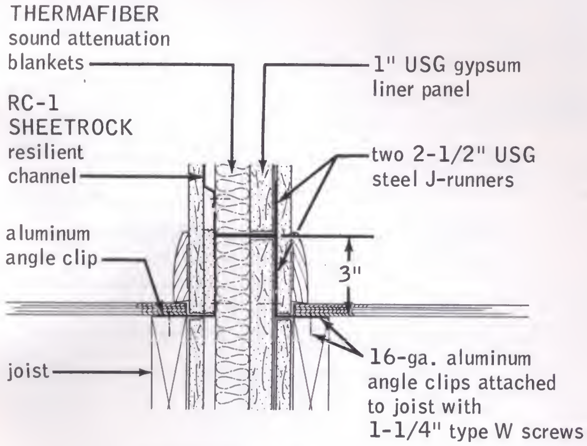
area separation walls/cavity type



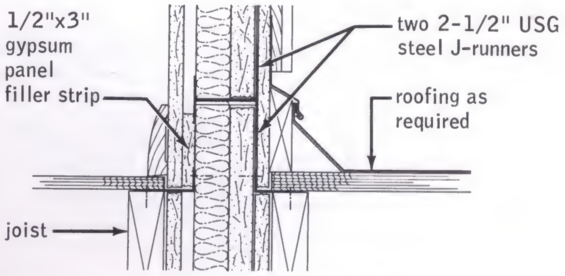
roof parapet


roofing as required
1/2"x3" gypsum panel filler strip
THERMAFIBER insulating blankets
2-1/2" USG steel J-runner
exterior surfacing
RC-1 SHEETROCK resilient channel

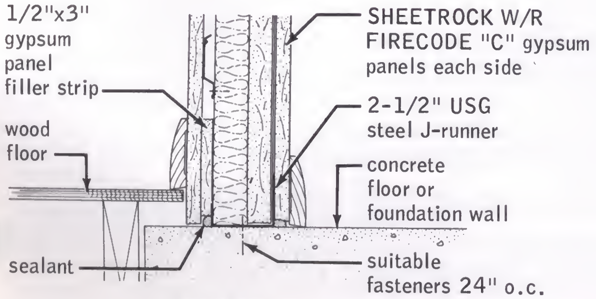
roof at rake end


THERMAFIBER sound attenuation blankets
1" USG gypsum liner panel
RC-1 SHEETROCK resilient channel
two 2-1/2" USG steel J-runners
aluminum angle clip
3"
joist
16-ga. aluminum angle clips attached to joist with 1-1/4" type W screws

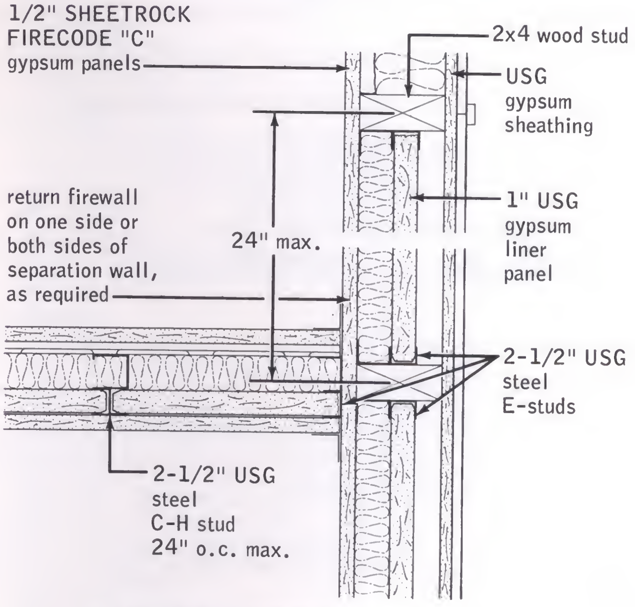
intermediate floor


1/2"x3" gypsum panel filler strip
two 2-1/2" USG steel J-runners
roofing as required
joist

intermediate floor/roof


1/2"x3" gypsum panel filler strip
SHEETROCK W/R FIRECODE "C" gypsum panels each side
2-1/2" USG steel J-runner
wood floor
concrete floor or foundation wall
sealant
suitable fasteners 24" o.c.

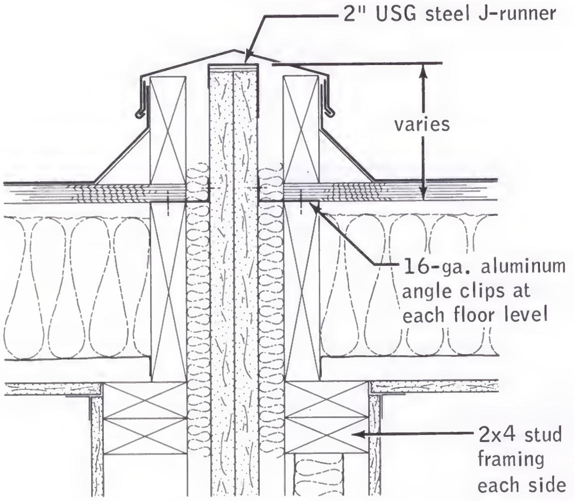
foundation


1/2" SHEETROCK FIRECODE "C" gypsum panels
2x4 wood stud
USG gypsum sheathing
1" USG gypsum liner panel
return firewall on one side or both sides of separation wall, as required
24" max.
2-1/2" USG steel E-studs
2-1/2" USG steel C-H stud 24" o.c. max.

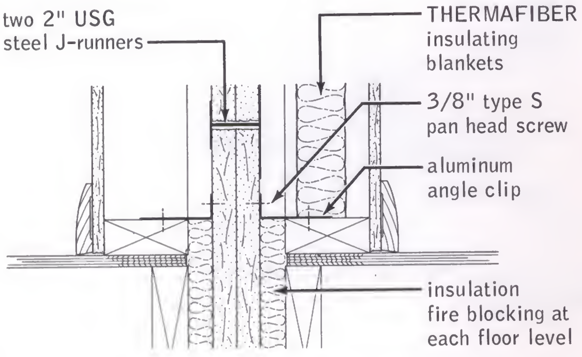
exterior wall intersection

area separation walls/solid type

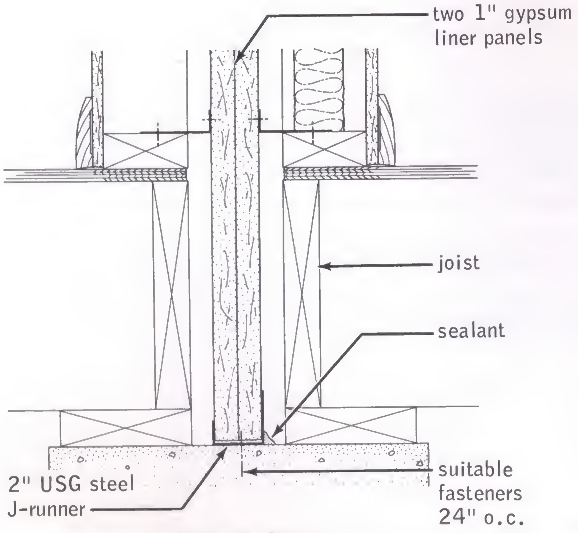
scale: 1½" = 1'-0"


2" USG steel J-runner
varies
16-ga. aluminum angle clips at each floor level
2x4 stud framing each side

roof parapet

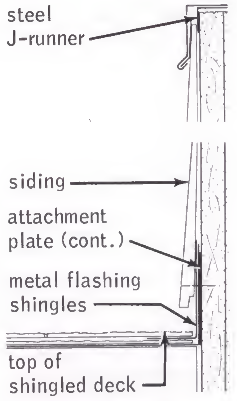

two 2" USG steel J-runners
THERMAFIBER insulating blankets
3/8" type S pan head screw
aluminum angle clip
insulation fire blocking at each floor level

intermediate floor

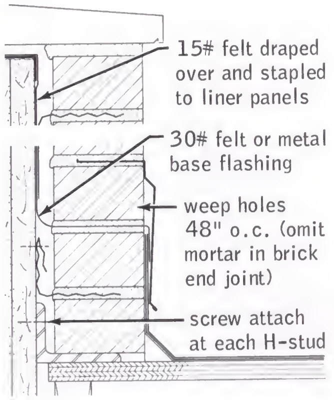


foundation

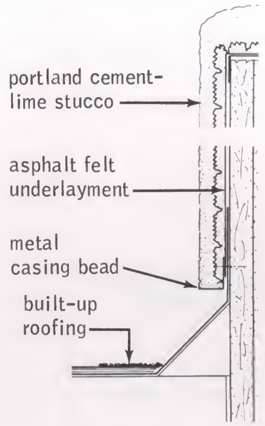
optional roof intersections



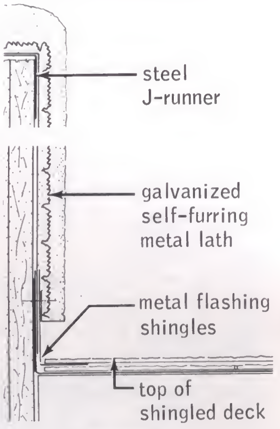
wood siding


15# felt draped over and stapled to liner panels
30# felt or metal base flashing
weep holes 48" o.c. (omit mortar in brick end joint)
screw attach at each H-stud

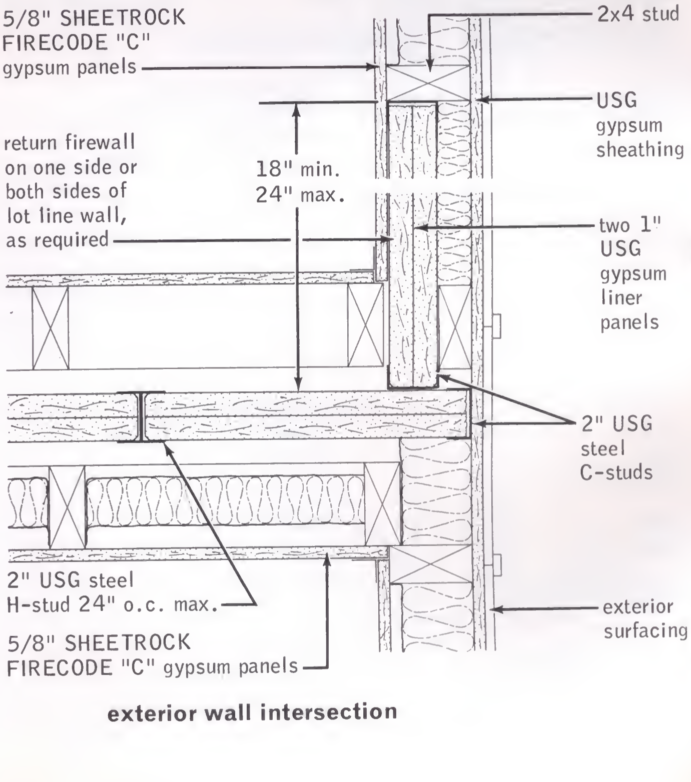
masonry veneer



stucco



stucco


5/8" SHEETROCK FIRECODE "C" gypsum panels
2x4 stud
USG gypsum sheathing
return firewall on one side or both sides of lot line wall, as required
18" min. 24" max.
two 1" USG gypsum liner panels
2" USG steel C-studs
2" USG steel H-stud 24" o.c. max.
5/8" SHEETROCK FIRECODE "C" gypsum panels
exterior surfacing

exterior wall intersection

specifications

notes to architect

1. *U.S.G. will provide test certification for published fire, sound and structural data covering systems designed and constructed according to its published specifications. Tests are conducted on U.S.G. products assembled to meet performance requirements of established test procedures specified by various agencies. System performance following any substitution of materials or compromise in assembly design cannot be certified and may result in failure under critical conditions.*

2. *Gypsum panel surfaces should be isolated with control joints or other stress relief where:* **(a)** *partition or furring abuts a structural element (except floor) or dissimilar wall or ceiling;* **(b)** *ceiling abuts a structural element, dissimilar wall or partition or other vertical penetration;* **(c)** *construction changes within the plane of the partition or ceiling;* **(d)** *partition or furring run exceeds 30′;* **(e)** *ceiling dimensions exceed 50′ in either direction;* **(f)** *the area within ceiling sections exceeds 2,500 sq. ft.;* **(g)** *exterior soffits exceed 30′ in either direction;* **(h)** *wings of "L", "U" and "T"-shaped ceiling areas are joined;* **(i)** *expansion or control joints occur in the base exterior wall. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.*

Gypsum panel surfaces should not be firmly anchored across the flat grain of wide dimensional lumber such as floor joists and headers. Float panels over these members using resilient channels or provide a control joint to counteract wood shrinkage.

3. *Penetrations of the gypsum panel diaphragm, such as door frames, borrowed-light openings, vents, grilles, access panels and light troffers, require additional reinforcement at the corners to distribute concentrated stresses if a control joint is not used.*

4. *Where these constructions are used for sound control, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical boxes, and at the perimeter of the assembly. Flanking paths and back-to-back penetrations of the diaphragm should be eliminated. Exterior wall surfaces should be resiliently mounted to minimize flanking paths between floor and ceiling construction. Door and borrowed-light openings are not recommended in sound control partitions.*

5. *For adhesive applications of TEXTONE Vinyl-faced Panels, only DURABOND Adhesives are recommended; other adhesives may not be compatible with the vinyl surface.*

6. Ceramic Tile—*SHEETROCK W/R Gypsum Panels are recommended as a base for adhesive application of ceramic, metal and plastic tile.*

7. Wood Framing Requirements—*Wood framing meeting the minimum requirements of HUD, ALSC and local building codes is necessary for proper performance.*

8. *To prevent objectionable sag in the gypsum panel ceiling, the weight of overlaid unsupported insulation should be limited to a uniform load of 1.2 psf for ½″ thick panels and 1.4 psf for ⅝″ panels. Foil-back panels or a separate vapor barrier should be installed in all exterior ceilings, and the plenum or attic space vented with a min. ½-sq. in. net free area per sq. ft. of horizontal surface.*

9. *Ridging or deformation at the panel joints may occur in gypsum board construction under adverse job or weather conditions. Back-blocking end joints will minimize joint ridging and is recommended. Where back-blocking is used, float the end joints between supports and back-block with an 8″ wide strip of gypsum board the full length of the joint adhesively applied over abutting ends. For fire-rated resilient construction, back butt-end joints with RC-1 Channels.*

10. Fixture Attachment—*Lightweight fixtures and trim should be installed using plastic plugs or other expandable anchors for screw attachment. Medium and heavyweight fixtures are not recommended on resilient surfaces, but if required, they should be supported from the primary framing.*

11. *The 1½″ USG Brand Type G Screw is not recommended for fastening double-layer laminated ⅜″ gypsum panels. In this assembly, use scaffold nails driven through gypsum blocks into the framing at third points vertically, or temporary shoring.*

12. *Treatment of joints and screwheads with joint compound may be omitted where gypsum panels serve as a base for adhesively applied acoustical tile.*

13. *All exposed surfaces of USG Exterior Gypsum Ceiling Board should receive two coats of U.S.G. exterior paint.*

14. *During periods of low outside temperature, airborne dirt may collect, producing photographing or shadowing over fasteners and furring of exterior walls. This natural phenomenon occurs through no fault of the products.*

15. *See U.S.G. product folders in this series: Gypsum Panels & Accessories Folder SA-927 for system components; Paint Products Folder SA-933 for paint specifications.*

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. Gypsum Board—48″ wide—(¼″) (⅜″) (½″) (⅝″) thick (Regular) (Foil-Back) Sheetrock Gypsum Panels; (½″) (⅝″) thick Sheetrock Firecode ("C") Gypsum Panels; ½″ thick Textone Gypsum Panels (type) (finish); (½″) (⅝″) thick Sheetrock W/R Gypsum Panels; (½″)(⅝″) thick Sheetrock W/R Firecode "C" Gypsum Panels; ½″ thick USG Exterior Gypsum Ceiling Board—lengths as required.
b. Underlayment—48″ wide—¾″ thick Pyrorock Sound Underlayment Board—lengths 6′ and 8′.
c. Liner Board—24″ wide 1″ USG Gypsum Liner Panels, beveled edge, lengths as required.
d. USG Steel C-H Studs 212CH5, hot-dipped galvanized, lengths as required.
e. USG Steel H-Studs 200HS7, hot-dipped galvanized, lengths as required.
f. USG Steel E-Studs 212ES5, hot-dipped galvanized, lengths as required.
g. USG Steel C-Studs 200CS7, hot-dipped galvanized, lengths as required.
h. USG Steel J-Runners (200JR7) (212JR7), hot-dipped galvanized, x 10′ lengths.
i. Angle Clip—2″ x 16-ga. aluminum angle clip, length as required —obtain locally.
j. Joint Treatment—(select a U.S.G. Joint System).
k. Adhesive
   —(for Back-Blocking and Fire-Rated Double-Layer Systems) —Durabond Joint Compound-Taping or 90.
   —(for Non-Rated Double-Layer Systems)—Durabond 500 or 600 Adhesive.
   —(for Adhesive Nail-On Panel Application)—Durabond 200 or 300 Adhesive.
   —(for Non-Rated Systems—specify with adhesive above)— Durabond Vinyl Foam Tape.
l. Fasteners
   —USG Brand Screws (1¼″ Type W) (1½″ Type G) (⅜″, 1″, 1⅛″, 1¼″, 1 5/16″, 1⅞″ Type S).
   —(for Non-Rated Systems)—1¼″, 1⅜″ GWB-54 Annular Ring Nails—obtain locally.
   —(for Fire-Rated Systems)—specify from fire test report.
m. USG Trim No. (200-A) (200-C) (401) (402) (P-1) (801-A) (801-B).
n. USG Corner Bead—(No. 103 Dur-A-Bead) (No. 104 Dur-A-Bead) (No. 800) Metal Corner Reinforcement.
o. USG Control Joint No. 093.
p. RC-1 Sheetrock Resilient Channel.
q. Thermafiber (Insulating Blankets) (Sound Attenuation Blankets).
r. USG Acoustical Sealant.

Part 3: execution

3.1 single-layer systems

3.1.1 gypsum panel erection—direct attachment

Apply gypsum panels to ceilings first, then to walls. Place panels (horizontally—right angles to framing) (vertically—parallel to framing). Position all ends over framing members in vertical application. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses. Place end joints on opposite sides of partitions on different studs. When necessary, cut ends, edges and cutouts within the field of the panel in a workmanlike manner.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space perimeter fasteners at least ⅜″ from ends and edges. Drive nails home with heads slightly below surface of panels to provide a uniform dimple. Do not use a nail set; avoid breaking face paper.

Attach gypsum panels to framing supports by;

a. Standard single nailing method—Attach panels with specified nails spaced 7″ o.c. max. for ceilings, 8″ o.c. max. for walls.

b. Adhesive-nail-on method—Attach gypsum panels with Durabond (200) (300) Adhesive applied in a continuous ⅜″ bead at center of attachment to face of framing members. Where two panels meet on a framing member, apply two beads permitting adhesive contact to both panels. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following panel erection, apply fasteners per manufacturer's directions. Impact panel by hand along framing to insure good contact at all points.

c. Double-nailing method—Attach gypsum panels with nails spaced 12″ o.c. with second nails in close proximity (2″).

d. Power-driven USG Brand Screws—Attach gypsum panels with 1¼″ USG Brand Type W Screws—spaced 12″ o.c. max.

e. Durabond Vinyl Foam Tape—Attach gypsum panels, using Durabond (200) (300) Adhesive and Durabond Vinyl Foam Tape applied in 8″ long strips according to manufacturer's directions.

3.1.2 predecorated Textone Gypsum Panel erection

Before application, pre-bow panels to a 2″ permanent bow convex to face of studs. Apply pre-bowed panels vertically to framing spaced (16″) (24″) o.c. Position less-than-full-width panels with cut edge at corner.

Apply Durabond (200) (300) Adhesive in continuous ⅜″ beads to face of studs in field of panel and in two ⅜″ beads at extreme edges of studs at vertical joints. Position panels within 15 min. after adhesive application and mechanically fasten 16″ o.c. along ceiling and floor edges of panels. Impact panel by hand along framing to insure good contact at all points.

Finish panel joints, edges and corners with Textone Mouldings matching specified panel finishes and installed according to manufacturer's directions.

3.1.3 Sheetrock W/R Gypsum Panel erection

a. Framing—If necessary, fur out studs so inside face of shower receptor is flush with gypsum panel face. Install appropriate blocking or headers to support tub and other plumbing fixtures, and to receive soap dishes, grab bars, towel racks and other hardware. When studs are more than 16″ o.c., or when ceramic tile over 5⁄16″ thick will be used, install suitable blocking between studs. Place blocking approximately 1″ above top of tub or receptor and at midpoint between base and ceiling.

b. Gypsum Panels—After tub, shower pan or receptor is installed, place temporary ¼″ spacer strips around lip of fixture. Pre-cut panels to required sizes and make necessary cut-outs. Before installing panels, apply Sheetrock W/R Sealant to all cut or exposed panel edges at utility holes, joints and intersections.

Install panels horizontally with paperbound edge abutting top of spacer strip. Fasten panels with nails 8″ o.c. max., or screws 12″ o.c. max. Where ceramic tile more than 5⁄16″ thick will be used, space nails 4″ o.c. max. and screws 8″ o.c. max. Adhesive-nail-on method (see 3.1.1 b above) may be used for attaching panels when ceramic tile no more than 5⁄16″ thick will be used.

In areas to be tiled, treat all fastener heads with Sheetrock W/R Sealant. Do not apply joint compound to joints or fastener heads in areas to be tiled. Apply joint treatment only to joints and fasteners *not* to be tiled.

Prior to tile erection, fill all openings around pipes, fittings and fixtures with specified caulking compound. Remove spacer strip but do not caulk gap at bottom edge of panels.

Note—Using an adhesive approved by the tile manufacturer, install tile down to top edge of shower floor or tub and overlapping lip or return of tub or receptor. Fill all tile joints with an unbroken application of grout. Apply caulking compound between tile and shower floor or tub.

3.1.4 back-blocking system

Note—Maximum spacing of supports, 24″ o.c. Select Sections **a** or **b**, depending upon job requirements. Floating and tapering end joints requires back-blocking. However, end joints may be back-blocked without tapering.

a. Float, back-block and taper all ceiling end joints except at perimeter of room.

b. Back-block all ceiling edge joints except at perimeter of room.

c. Apply Sheetrock Gypsum Panels with long edges at right angles to framing and with end joints midway between supports. Wood backing behind joints between framing supports is not required. Use ⅜″ or ½″ thick gypsum backing blocks for ½″ ceiling finish; ½″ or ⅝″ thick blocks for ⅝″ ceiling finish. Apply adhesive to face side if foil-backed blocks are used.

3.1.5 floating interior angle system

Apply gypsum panels to ceilings first. Follow standard framing practices for corner fastening. Fit panels snugly at all angles. Apply gypsum panels to walls to maintain firm support for ceiling panels. At horizontal angles, apply the first fastener 8″ from the intersection. At vertical interior angles attach the overlapping panel only, at the angle. Use conventional fastening in remainder of area.

3.2 double-layer systems

3.2.1 base layer erection—direct attachment

a. Ceilings—Apply gypsum panel base layer on ceilings first (horizontally—right angles to framing) (vertically—parallel to framing). Position end joints to offset face layer joints by at least 10″; joints may occur on or between framing members. Apply foil-back panels with foil side against framing.

b. Sidewalls—Apply gypsum panel base layer with long edges centered on framing members (vertically). When predecorated face layers will be used, apply base layer horizontally. Apply foil-back panels with foil side against framing. Attach panels to framing supports by (screw) (nail) attachment as follows:

c. Screw Attachment—Attach panels with power-driven 1¼″ Type W Screws spaced 12″ o.c. max. For walls with studs 16″ o.c., screws may be applied 16″ o.c. max. Stagger screws on adjoining edges and ends.

d. Nail Attachment—Attach panels with specified nails spaced 7″ o.c. max. on ceilings, 8″ o.c. max. on walls. Drive nails so heads are flush with surface and opposite each other on adjacent ends and edges.

Drive fasteners in field of panel first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Space fasteners ⅜″ min. from ends and edges.

3.2.2 face layer erection—direct attachment

Use gypsum panels in maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints at least 10″ from parallel joints in base layer. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

After panels are cut to size, mix and apply adhesive according to manufacturer's directions and laminate face layer to base layer in the following manner:

Sheet Lamination—For fire-rated construction, apply Durabond Joint Compound-Taping or 90 to entire back surface of face panels and to extreme edges of panels. Apply adhesive in beads approximately ⅜″ wide at base and ½″ high and spaced 4½″ o.c. Laminate face layer to base layer using moderate pressure and temporary support or supplemental fastening as follows:

a. Temporary nailing—Use nails with at least ¾″ penetration into framing. Space nails 16″ to 24″ o.c. When proper bond is developed, remove nails and dimple holes for joint treatment.

b. Temporary supports—Brace or shore face layer every 16″ to 24″. When proper bond is developed, remove supports.

c. USG Brand Screws—Permanently attach face layer with 1½″ Type G Screws. Space screws along edges 36″ o.c. max., within 2″ of joint and 12″ of both ends. In field of panel, space screws along centerline, 48″ o.c. max. and within 24″ of ends.

Strip Lamination—For fire-rated construction, apply Durabond Joint Compound-Taping or 90 to base layer panels in vertical strips of four ½″ beads, 1½″ to 2″ o.c. Space strips 24″ o.c. Permanently attach face layer with 1½″ Type G Screws placed to penetrate adhesive strips. Space screws along edges 36″ o.c. max., within 2″ of joint and 12″ of both ends. In field of panel, space screws along centerline, 48″ o.c. max. and within 24″ of both ends.

For non-rated construction, laminate face panels to base layer as follows:

Durabond 500 Adhesive—Apply adhesive in strips using notched spreader having ¼″ x ¼″ min. notches spaced 2″ o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten as required. For walls, use pre-bowed panels, erect panels vertically and fasten 16″ o.c. at top and bottom of panel. For ceilings, space fasteners 16″ o.c. along edges and ends, with one permanent field fastener per framing member at mid-width of panel.

Durabond 600 Adhesive—Apply adhesive to both contact surfaces; let adhesive air dry until color turns from lighter to darker blue; erect panels as soon as possible after drying. Position panel, press panel firmly in place and fasten as required. For horizontal application to walls and for all ceiling applications, fasten face panel at each corner and along edges spaced 48″ o.c. max. For vertical application to walls, use pre-bowed panels and fasten 16″ o.c. at top and bottom of panel.

Durabond Vinyl Foam Tape—Attach gypsum panels, using Durabond 500 Adhesive and Durabond Vinyl Foam Tape applied in continuous strips across back face of panel according to manufacturer's directions.

3.2.3 face layer erection—Textone Gypsum Panels

Before application, pre-bow panels to a 2″ permanent bow convex to face of studs. Apply pre-bowed panels vertically with joints staggered at least 10″ from parallel joints in base layer. Position less-than-full-width panels with cut edge at corner. When necessary, cut ends, edges and cutouts within field of panels in a workmanlike manner.

For fire-rated construction, install panels using Durabond Joint Compound-Taping or 90 as laminating adhesive. Apply adhesive to base layer in vertical strips of four ½″ beads, 1½″ to 2″ o.c. Space strips 24″ o.c. Fasten panels 16″ o.c. at top and bottom of panel.

For non-rated construction, install face layers using Durabond (500) (600) Adhesive as follows:

a. Durabond 500 Adhesive—Apply adhesive in strips using notched spreader having ¼″x¼″ min. notches spaced 2″ o.c. max. Apply strips to back of face panel in center and along both edges. Position panel, press firmly in place and fasten 16″ o.c. at top and bottom.

b. Durabond 600 Adhesive—Apply adhesive to both contact surfaces; let adhesive air-dry until color turns from lighter to darker blue; erect panels as soon as possible after drying. Position panel, press firmly in place and fasten 16″ o.c. at top and bottom.

Finish panel joints, edges and corners with Textone Mouldings matching specified panel finishes and installed according to manufacturer's directions.

3.3 resilient attachment systems

3.3.1 resilient channel erection

Position resilient channels at right angles to wood framing, space (16″) (24″) o.c. and attach to supports with 1¼″ Type W, 1¼″ Type S or 1″ Type S Screws driven through holes in channel mounting flange.

On walls, attach ½″x3″ wide continuous filler strips to bottom plate. Install channels with mounting flange down, top channel max. 6″ down from ceiling, bottom channel 24″ up from floor. Extend channels into all corners and attach to corner framing. Position channels max. 6″ from wall-ceiling angle. Cantilever channel ends no more than 6″. For double-layer system, attach channel through base layer to framing with 1⅞″ Type S Screws.

Splice channel by nesting directly over framing member; screw-attach through both flanges. Reinforce with screws located at both ends of splice.

Where cabinets are to be installed, attach RC-1 Channels to studs at center of top and bottom cabinet hanger brackets. When distance between hangers exceeds 24″ o.c., install additional channel at midpoint between hangers.

3.3.2 gypsum panel erection—walls

Apply gypsum panels of maximum practical length with long dimension parallel to resilient channel and fastened with 1″ Type S Screws spaced 12″ o.c. along channels. Center horizontal abutting edges over screw flange of channel. Where channel resiliency makes screw placement difficult, the next longer screw may be used but do not drive screw directly over stud. For direct attachment, fasten panels to wood studs with 6d nails 8″ o.c.

For two-layer application of gypsum panels, apply base layer vertically and attach to resilient channels with 1″ Type S Screws spaced 24″ o.c. and to wood studs with 1¼″ Type W Screws 12″ o.c. Apply face layer with long dimension at right angles to long edges of base layer and fasten with 1$\frac{5}{16}$″ Type S Screws spaced 16″ o.c.

3.3.3 gypsum panel erection—ceilings

a. Base Layer—For fire-rated assembly, apply gypsum base-layer panels with long edges across joists and end joints staggered. Fasten panels to framing with 8d cement-coated nails spaced 7″ o.c. Attach resilient channel through base layer perpendicular to framing with 1⅞″ Type S Screws.

b. Face Layer—Apply face-layer panels of maximum practical length with long dimension at right angles to resilient channels and end joints staggered. End joints may occur over resilient channels or midway between channels with joint floated and back-blocked. Fit ends and edges closely, but not forced together. Fasten panels to channels with 1″ Type S Screws spaced 12″ o.c. in field of panels and along abutting ends. Cut panels neatly and provide support around cutouts and openings.

3.4 area separation wall system

3.4.1 cavity wall

a. Foundation—Position 2½″-wide steel J-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24″ o.c. When specified, caulk runner at foundation with ¼″ bead of USG Acoustical Sealant.

b. First floor—Install 1″ liner panels and steel studs cut to length 3″ more than floor-to-floor height. Erect liner panels vertically in J-runner with long edges in groove of C-H stud. Install C-H studs between panels and cap ends of run with E-stud. Fasten all studs at bottom to J-runner flange with ⅜″ Type S Screws.

c. Intermediate floors—Cap top of panels and studs with J-runner and fasten studs to J-runner flanges with ⅜″ Type S Screws. Install bottom J-runner for next row of panels over top runner with end joints staggered at least 12″. Fasten runners together with double ⅜″ screws at ends and spaced 24″ o.c. Secure each stud to framing with 16-ga. aluminum angle clip, fastened to studs with ⅜″ screws and to framing or subfloor with 1¼″ Type W Screws.

d. Roof—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with J-runner and fasten studs to flanges with ⅜″ screws. Fasten studs to framing with aluminum clips.

e. Sound attenuation blankets—Install blankets between studs and attach to liner panel with five 9/16″ staples driven through each blanket, one in center and others spaced 3″ from each corner. Butt ends of blankets closely and fill all voids.

f. Resilient channels—When specified, install RC-1 Resilient Channels horizontally to face side of studs, 6″ above floor, 6″ below ceiling joists and max. 24″ o.c. Attach channels to studs with ⅜″ Type S Screws driven through holes in mounting flange. Extend channels to ends of runs and attach to E-studs. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice.

g. Gypsum panels—Apply ½″ Sheetrock W/R Firecode "C" gypsum panels vertically to both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1″ Type S Screws spaced 12″ o.c. in field and along edges and runner flanges.

h. Resilient single-layer—Apply ½″ gypsum panels vertically to resilient channels and fasten with 1¼″ Type S Screws placed 6″ away from stud and 12″ o.c. Do not place screws directly over stud.

i. Resilient double-layer—Apply ⅝″ gypsum panel base layer horizontally to resilient channels with end joints staggered; fasten with 1¼″ Type S Screws placed 6″ away from stud and 12″ o.c. Apply ⅝″ gypsum panel face layer vertically over base layer and attach with 1⅝″ Type S Screws spaced 12″ o.c. and staggered from those in base layer.

3.4.2 solid wall

a. Foundation—Position 2″ wide steel J-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24″ o.c. When specified, caulk runner at foundation with ¼″ bead of acoustical sealant.

b. First floor—Install liner panels and H-studs cut to convenient length more than floor-to-floor height. Install two thicknesses of 1″ liner panels vertically in J-runner with long edges in H-stud. Erect H-studs and double-thickness panels alternately until wall is completed. Cap ends of run with C-stud. Fasten all studs to J-runner flange with ⅜″ Type S Screws.

c. Intermediate floors—Cap top of panels and studs with back-to-back J-runners screw-attached together with double ⅜″ Type S Screws at ends and spaced 24″ o.c. Fasten studs to runner flange with ⅜″ screws. Secure studs to framing with 16-ga. aluminum angle clips screw-attached to studs and framing. Except at foundation, install fire blocking between joists and fire barrier.

d. Roof—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with J-runner and fasten to studs with ⅜″ screws. Fasten studs to framing with aluminum clips.

e. Interior finish—Apply single-layer ⅝″ Sheetrock Firecode "C" Gypsum Panels to wood studs and joists with screws or nails in conventional manner.

3.5 wall furring systems

3.5.1 single-layer application—direct attachment

Space suitable wood furring strips 16″ o.c. and attach to masonry walls. Apply gypsum panels of maximum practical length with long dimension at right angles to furring strips. Fasten panels with 1¼″ Type W Screws spaced 12″ o.c. Apply foil-back panels with foil side against furring. Where there is a possibility of water penetration through exterior walls, install an asphalt felt strip between furring strips and wall.

3.5.2 single-layer application—resilient attachment

Position resilient channels horizontally and attach with 2″ cut nails in mortar joints or brick, clay tile or concrete block or in field of lightweight aggregate block; ⅝″ concrete stub nails or power-driven fasteners in monolithic concrete. Space fasteners 24″ o.c. Position channels within 4″ of floor and ceiling line and not more than 24″ o.c.

Apply gypsum panels of maximum practical length with long dimension parallel to resilient channels. Fasten panels with 1″ Type S Screws spaced 12″ o.c. Center horizontal abutting edges over screw flange of channel. Apply foil-back panels with foil side against channels. Where there is a possibility of water penetration through exterior walls, install an asphalt felt strip between resilient channels and wall.

3.6 exterior ceilings and soffits

Apply USG Exterior Gypsum Ceiling Board (horizontally) (vertically) with end joints over supports and with 1/16″ to ⅛″ space between butted ends of boards. Use maximum practical lengths to minimize end joints. Fasten boards to supports with screws spaced 12″ o.c. or nails spaced 8″ o.c. Where specified, cover joints with wood battens securely fastened to framing. Finish joints, trim and fasteners with exterior joint system applied according to manufacturer's directions.

3.7 underlayment application

Plywood subfloor must be sound, securely attached to framing, free of surface irregularities, and cleared of foreign material. Install Pyrorock Sound Underlayment Board with long dimension perpendicular to joists. Locate all end joints over joists, staggered with adjacent end joints and with joints in subfloor. Fasten boards with 1¼″ Type W Screws or 6d ring-shank nails spaced 16″ o.c. along each joist and around board cutouts. Drive fasteners flush with or below board surface. Except for carpet and pad or wood parquet flooring, fill all joints, fastener dimples and minor surface defects with Durabond 90 Joint Compound. Seal entire room perimeter and all penetrations of underlayment with min. ¼″ bead of USG Acoustical Sealant along board edge.

3.8 accessory application

a. Joint System—Finish all face panel joints and internal angles with a U.S.G. Joint System installed according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

b. Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with 9/16″ rosin-coated staples 12″ o.c. on both flanges along entire length of bead.

c. Metal Trim—Where partition or ceiling terminates against masonry or other dissimilar material, apply metal trim over gypsum panel edge and fasten with screws or staples 12″ o.c.

d. P-1 Vinyl Trim—Slip trim over gypsum panel edge with long flange behind panel. Install panel with trim firmly abutting surface.

e. Screws—Power-drive at least ⅜″ from edges or ends of gypsum panels to provide uniform dimple 1/32″ deep.

f. Control Joints—Break gypsum panels and resilient channels behind joint and back by double supports. Attach control joint to face layer with staples spaced 6″ o.c. on both flanges along entire length of joint.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE, PERF-A-TAPE, DURABOND, DUR-A-BEAD, THERMAFIBER, TEXTONE, MASTICAL, PYROROCK.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

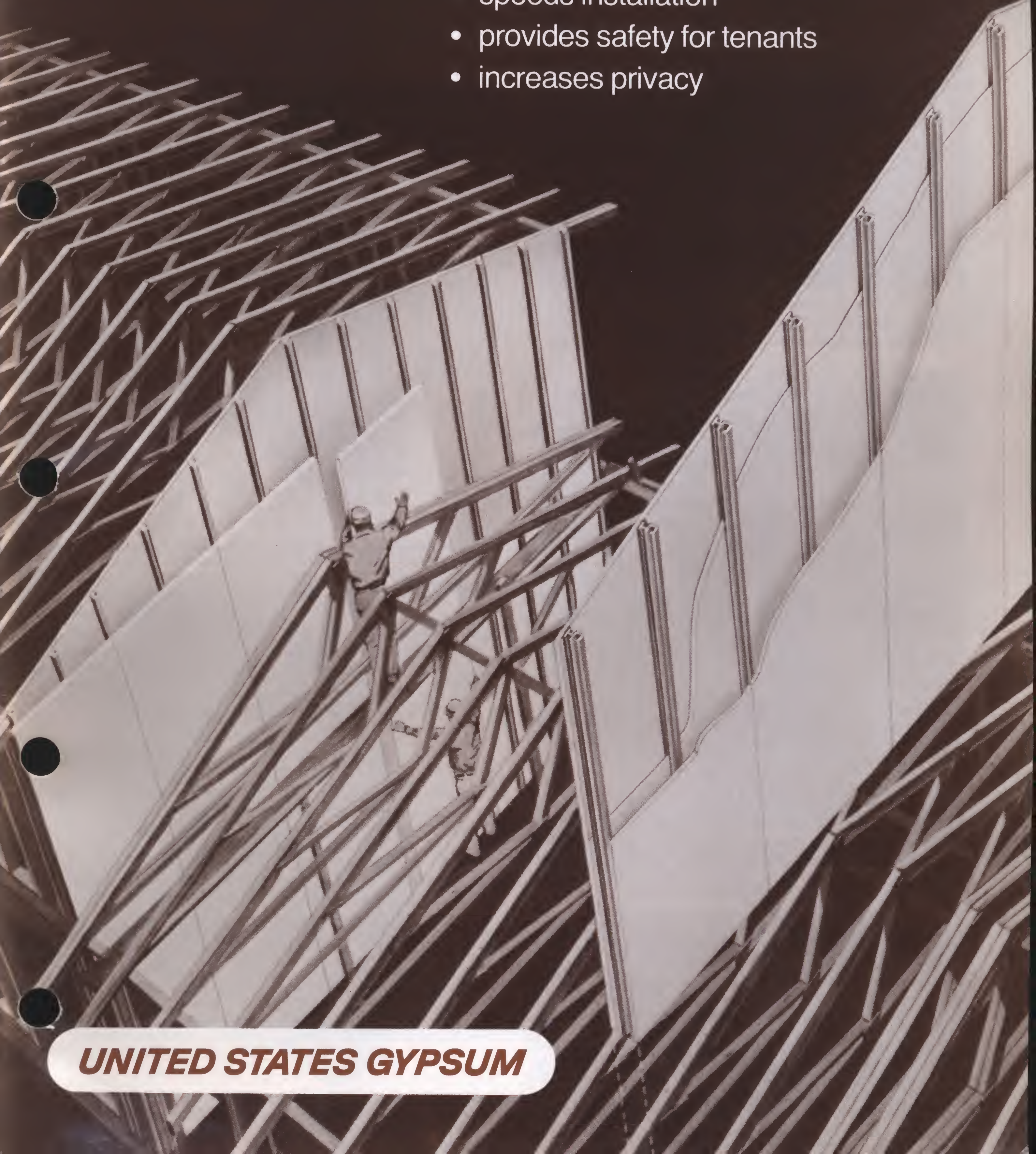
UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606
SA-924/USG/1-77

USG® Area Separation Walls

Lower-cost, fire- and sound-resistant, improved cavity system . . .

9.6/Ung

- speeds installation
- provides safety for tenants
- increases privacy



UNITED STATES GYPSUM

USG Area Separation Walls

Fast-erecting drywall partitions for economical fire barriers in multi-family housing

USG Area Separation Walls are designed as a fire and sound barrier between units in multi-family wood-frame buildings such as garden apartments, condominiums and townhouses. Some code bodies and localities identify this type of wall by various names such as fire wall or barrier, lot line wall or party wall.

An economical combination of noncombustible gypsum panels and steel components, USG Area Separation Walls provide a protective barrier with sufficient structural stability under fire conditions to allow collapse of the structure on one side while maintaining its integrity on the other.

There is a choice of two cost-reducing systems—*Cavity Type* and *Solid Type*. Both systems are continuous, vertical wall assemblies of gypsum panels attached to steel framing that extend from foundation through the roof and act as barriers to fire and sound transmission. Because they combine comparable fire and sound resistance in a thin, space-saving partition at *lower in-place cost,* they are superior to masonry construction in meeting code requirements for multi-unit buildings.

Improved Cavity Type Wall is used as a commonly shared party wall with non-load bearing framing. Consists of new, lighter steel C-H Studs, 1-in. gypsum liner panels set in steel runners and faced both sides with lightweight SHEETROCK W/R FIRECODE "C" Gypsum Panels.

In this cavity system, liner panels are erected vertically with ends set into 2½-in. USG J-Runners and edges inserted into specialy formed 2½-in. USG Steel C-H Studs screw-attached to runners. J-runners are installed singly at top and bottom of wall and back-to-back between vertical liner panels on a line 3 in. above each intermediate floor.

Aluminum angle clips, which attach studs to adjacent wood framing, melt and break away when exposed to fire, permitting a fire-damaged structure to fail while the fire barrier remains intact. To improve sound transmission loss, THERMAFIBER Sound Attenuation Blankets are inserted in the stud cavity and RC-1 Resilient Channels may be used to isolate the face layer.

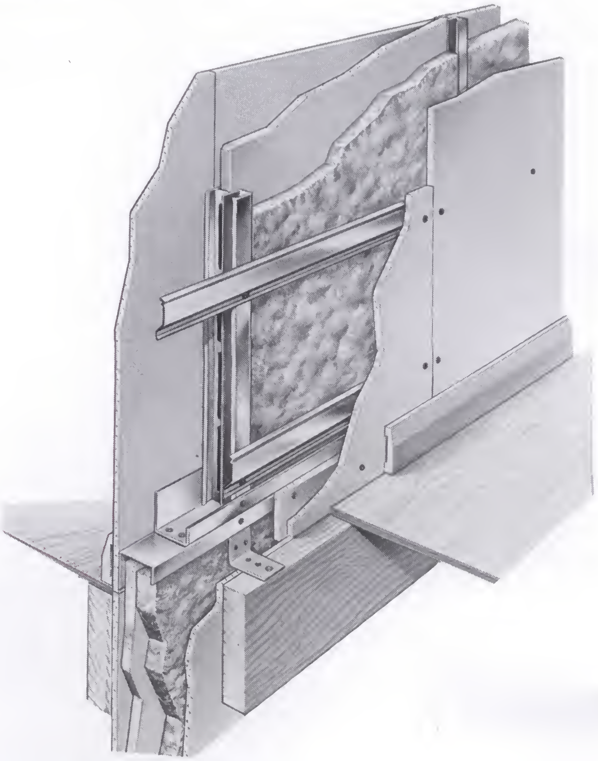
With USG Steel C-H Studs 212CH5 spaced 24 in. o.c., the assemblies are suitable for floor-to-ceiling heights up to 11 ft. under 5-psf lateral load and up to 8 ft. as exterior walls under 15-psf wind load without exceeding 1/240 allowable deflection.

Solid Type Wall is constructed of separately framed panels on both sides of the fire barrier and is preferred when floor joists are perpendicular to the wall. May be used with either non-load bearing or load-bearing framing, and consists of double-layer of 1-in. thick gypsum liner panels installed vertically between 2-in. USG Steel J-Runners.

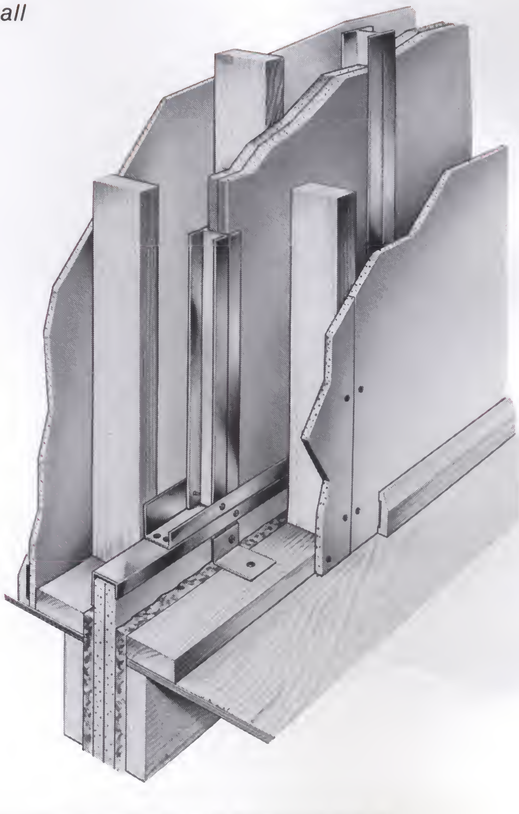
To complete the solid system, panel edges are inserted in 2-in. USG Steel H-Studs spaced 24 in. o.c. and screw-attached to runners. J-runners are installed at top and bottom of wall and back-to-back between vertical panels at a convenient height above each intermediate floor. Steel studs are attached to wood framing with 0.063" aluminum angle clips which break away when exposed to fire. As with the cavity system, they permit a fire-damaged structure to collapse without causing the fire barrier to fail.

With USG Steel H-Studs 200HS7, the assembly is suitable for floor-to-ceiling heights up to 10 ft. under 5-psf lateral load without exceeding 1/240 allowable deflection.

cavity wall



solid wall



Construction using the breakaway aluminum clip is covered by Patent No. 3,974,607.

Copyright 1977, United States Gypsum Company

7 EXCLUSIVE FEATURES FOR BUILDER AND TENANT

safety for occupants

Both USG Separation Walls offer 2-hour fire ratings; the cavity system qualifies for 3-hour rating with an additional layer of ⅝" SHEETROCK W/R FIRECODE "C" panels. Concealed openings in the construction are fire-stopped at each floor/ceiling level to resist vertical spread of fire. Assemblies have sufficient structural stability under fire to meet the fire-protection requirements of code bodies.

Request a viewing of the U.S.G. movie, "Fire Proved", which demonstrates how effectively Area Separation Walls protect adjacent areas or living units from fire and heat damage.

weight, cost savings

These assemblies use low-cost materials and save jobsite labor. Because they are lighter in weight—50% less than masonry walls—less material has to be handled during installation and in-place costs are reduced.

speed occupancy

Using procedures familiar to the trade, carpenters can erect these systems together with or immediately after completion of the framing and roof trusses. This provides good job continuity and eliminates the delays of waiting for masonry erection or for mortar to dry. Dry construction permits installation in any weather men normally work to minimize cold-weather delays. Other trades can begin sooner—projects move faster, buildings are occupied sooner for quicker rental income and lower interim costs.

improve privacy

The systems provide economical sound control that helps apartments to sell or rent quicker with less turnover. The cavity wall, with single-layer ½-in. face panels and 1-in. THERMAFIBER Sound Attenuation Blankets in the cavity, offers 47 STC rating, or 50 STC with RC-1 Resilient Channels and 1½-in. blankets; 57 STC with double-layer ⅝-in. gypsum panels attached to the RC-1 Channels, 1½-in. THERMAFIBER Blankets in cavity and single-layer panels one side.

The solid wall offers 57 STC rating with single-layer ⅝-in. face panels attached to 2x3 wood studs and THERMAFIBER Insulating Blankets in stud cavity on each side of the solid fire barrier. The assembly provides 54 STC with blankets on only one side and 45 STC without insulation.

increase floor space

The thinner 3½ to 4-in. width for cavity walls, compared to 8 to 12-in. for masonry walls without interior finish, means added floor space available for each unit. This can allow additional income-producing units to be included.

high-quality components

Most components of these systems are designed to permit temporary exposure to inclement weather during construction. Moisture-resistant paper facings on USG Gypsum Liner Panels shed water, protect the special fire-resistant core. Structural runners and studs are formed from hot-dipped galvanized steel for added corrosion resistance. THERMAFIBER Sound Attenuation Blankets are encased in vinyl film to resist water damage. SHEETROCK W/R FIRECODE "C" Panels have a water-resistant gypsum core and multi-layered green face and brown back paper chemically treated to combat moisture penetration.

Panels, ½ or ⅝-in. thick and 4-ft. wide with tapered edges, are available in lengths up to 12-ft. Trim, corner bead, screws, other accessories are available to complete project.

Aluminum angle clips provide attachment of USG Area Separation Wall to adjacent wood framing; clips melt and break away when exposed to fire. Fire barrier remains intact while fire-damaged structure fails.

No delays in siding application are encountered with USG Area Separation Walls since same crews install firewalls, siding and roofing.

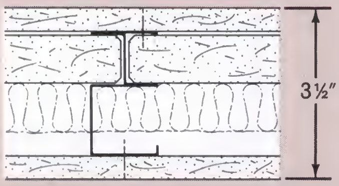
performance-tested and proved

Engineered and field-tested to provide optimum performance and meet design requirements, these systems may be used in buildings up to three stories high and with all common floor-ceiling heights found in multi-family housing. Both cavity and solid types are suitable for exterior walls with appropriate weather-resistant facing when offset sloping roofs are desired; also for use with flat decks of wood or poured gypsum concrete. Gypsum roof decks satisfy fire code requirements without above-deck firewall extensions; also allow drainage slopes to be formed in the slab instead of the framing.

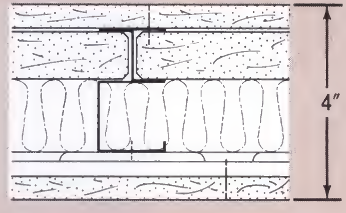
details

rated assemblies

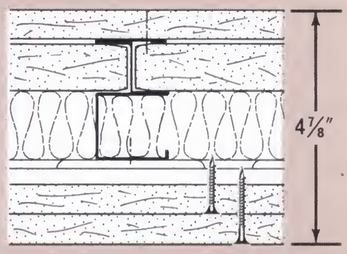
cavity walls



2 Hrs. est. based on U of C 6-23-75
47 STC—BBN-750704

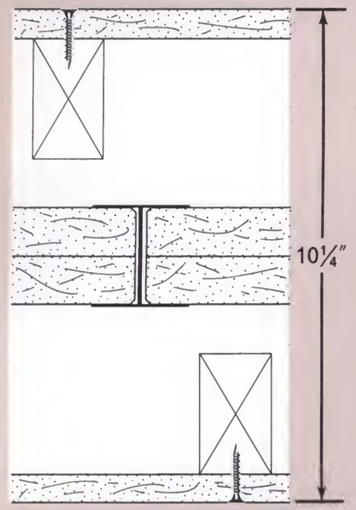


2 Hrs. est. based on U of C 6-23-75
50 STC—BBN-750411

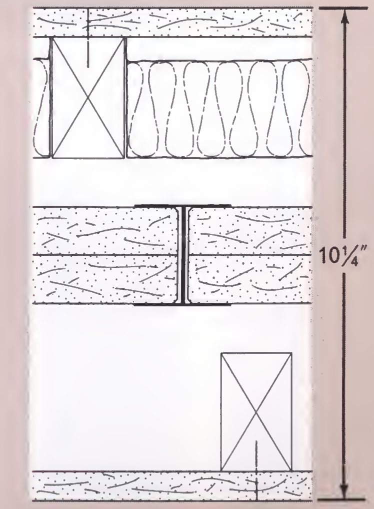


3 Hrs. est. based on U of C 2-16-72
57 STC—BBN-730622

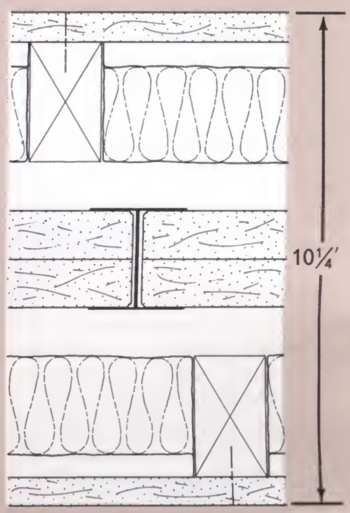
solid walls



2 Hrs. est. based on T-4481-OSU
45 STC—BBN-730104—no blkts.

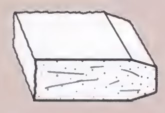


2 Hrs. est. based on T-4481-OSU
54 STC—BBN-730103—blkts. 1 side

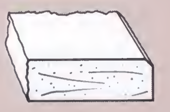


2 Hrs. est. based on T-4481-OSU
57 STC—BBN-730102—blkts. 2 sides

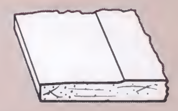
components



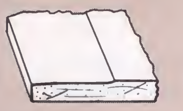
1″ USG gypsum
liner panel
(C-H stud)



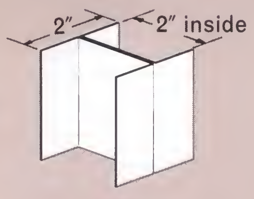
1″ USG gypsum
liner panel
(H-stud)



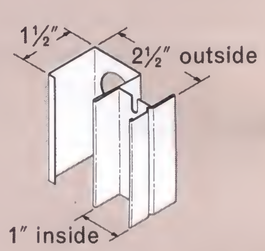
SHEETROCK W/R
FIRECODE "C"
gypsum panel



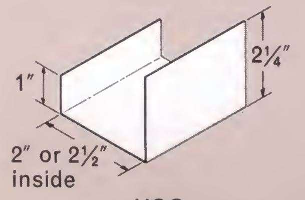
SHEETROCK
FIRECODE "C"
gypsum panel



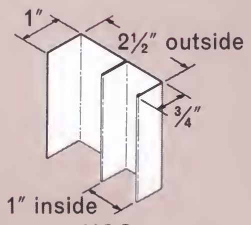
USG
steel H-stud



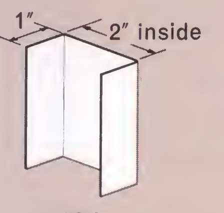
USG
steel C-H stud



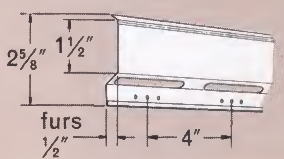
USG
steel J-runner



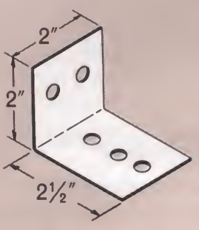
USG
steel E-stud



USG
steel C-stud

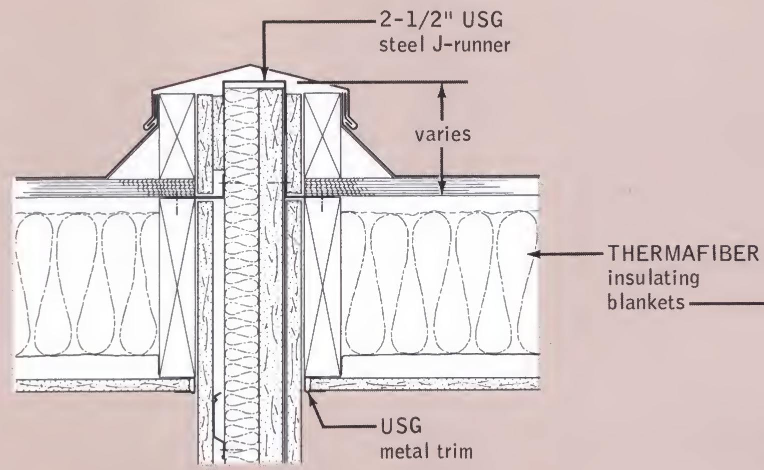


RC-1
resilient channel

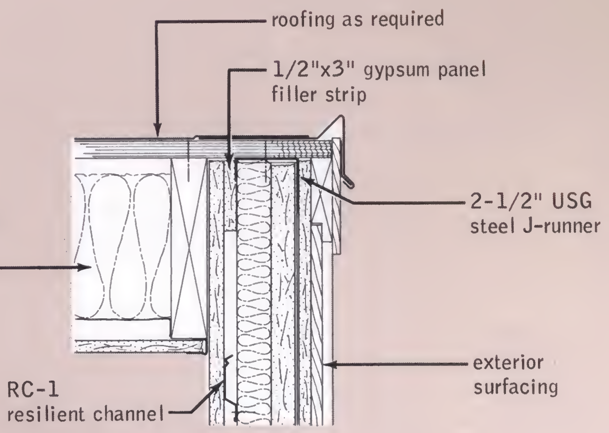


.063 aluminum
angle clip

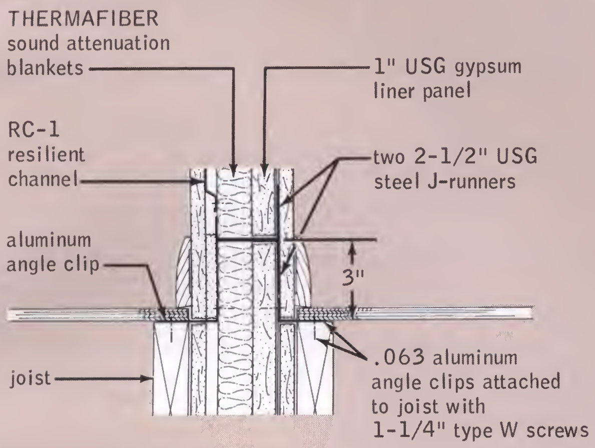
cavity walls



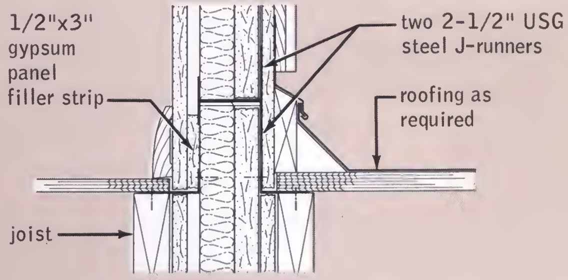
roof parapet



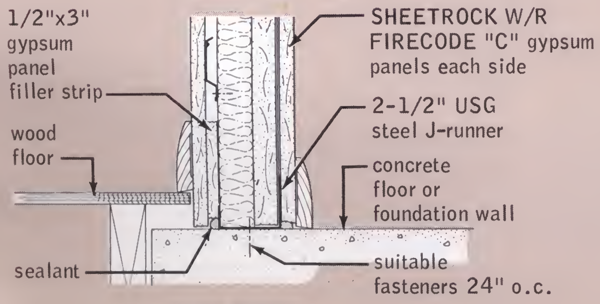
roof at rake end


THERMAFIBER sound attenuation blankets
1" USG gypsum liner panel
RC-1 resilient channel
two 2-1/2" USG steel J-runners
aluminum angle clip
3"
joist
.063 aluminum angle clips attached to joist with 1-1/4" type W screws

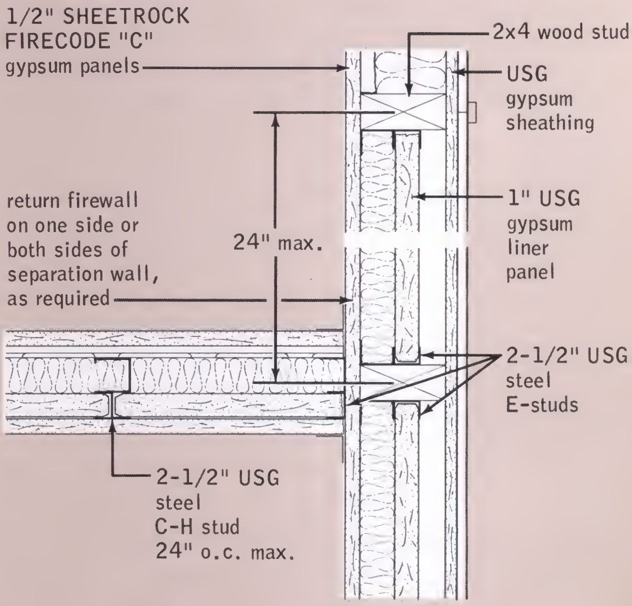
intermediate floor


1/2"x3" gypsum panel filler strip
two 2-1/2" USG steel J-runners
roofing as required
joist

intermediate floor/roof


1/2"x3" gypsum panel filler strip
SHEETROCK W/R FIRECODE "C" gypsum panels each side
2-1/2" USG steel J-runner
wood floor
concrete floor or foundation wall
sealant
suitable fasteners 24" o.c.

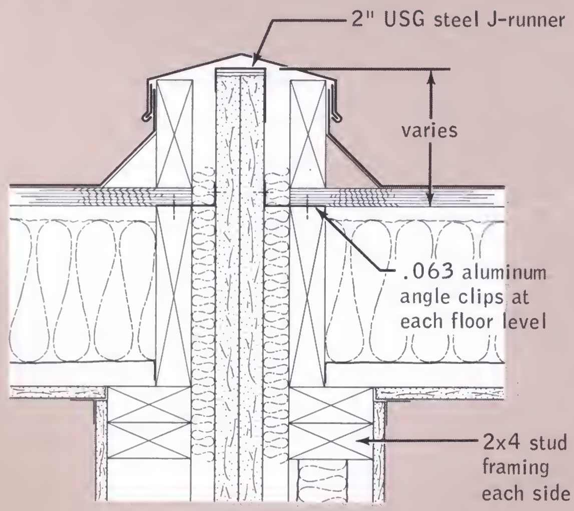
foundation


1/2" SHEETROCK FIRECODE "C" gypsum panels
2x4 wood stud
USG gypsum sheathing
1" USG gypsum liner panel
24" max.
return firewall on one side or both sides of separation wall, as required
2-1/2" USG steel E-studs
2-1/2" USG steel C-H stud 24" o.c. max.

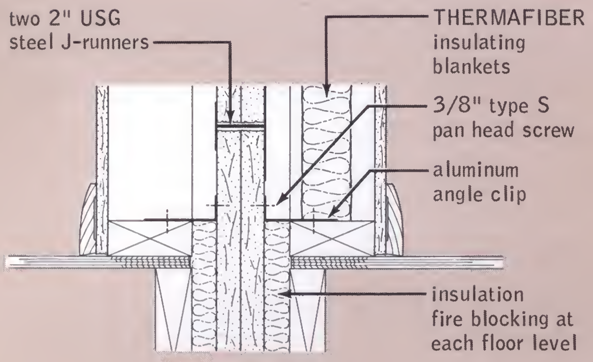
exterior wall intersection

solid walls

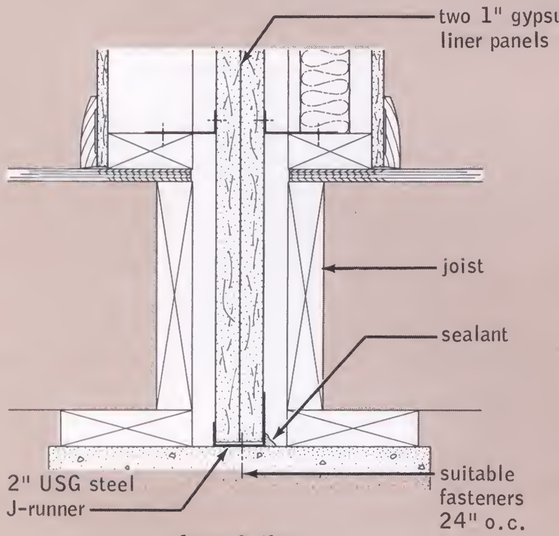
area separation walls/solid type


2" USG steel J-runner
varies
.063 aluminum angle clips at each floor level
2x4 stud framing each side

roof parapet

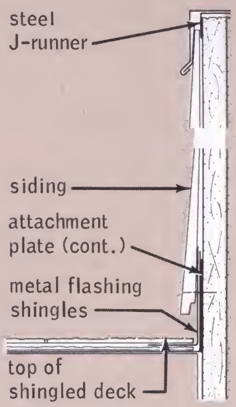

two 2" USG steel J-runners
THERMAFIBER insulating blankets
3/8" type S pan head screw
aluminum angle clip
insulation fire blocking at each floor level

intermediate floor

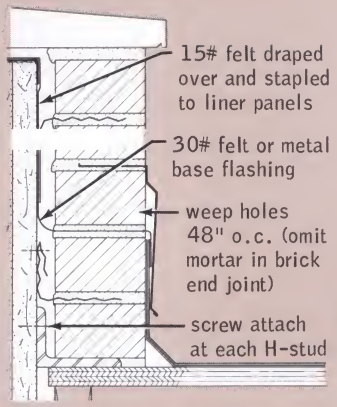


foundation

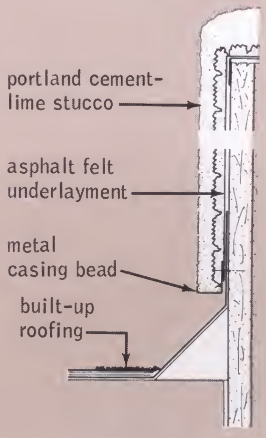
optional roof intersections



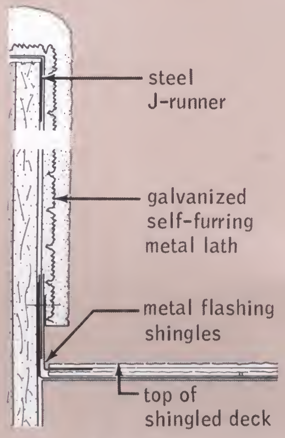
wood siding


15# felt draped over and stapled to liner panels
30# felt or metal base flashing
weep holes 48" o.c. (omit mortar in brick end joint)
screw attach at each H-stud

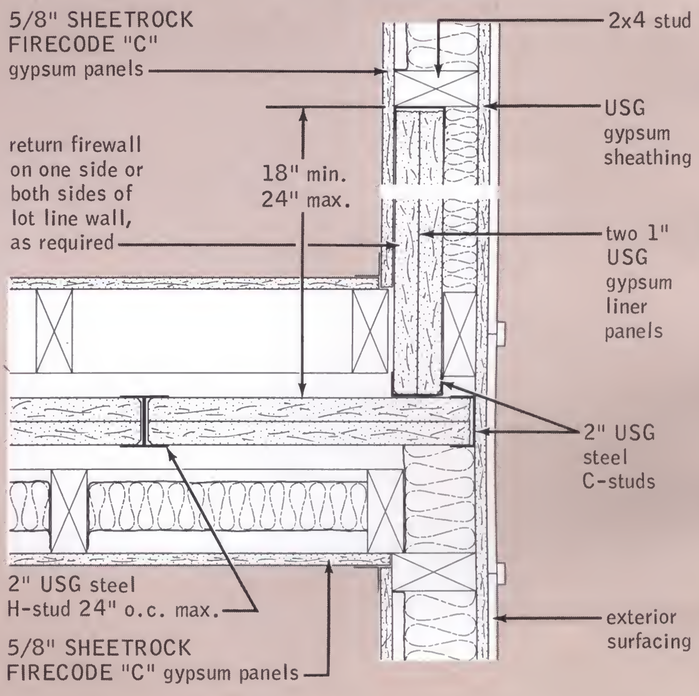
masonry veneer



stucco



stucco


5/8" SHEETROCK FIRECODE "C" gypsum panels
2x4 stud
USG gypsum sheathing
18" min. 24" max.
return firewall on one side or both sides of lot line wall, as required
two 1" USG gypsum liner panels
2" USG steel C-studs
2" USG steel H-stud 24" o.c. max.
5/8" SHEETROCK FIRECODE "C" gypsum panels
exterior surfacing

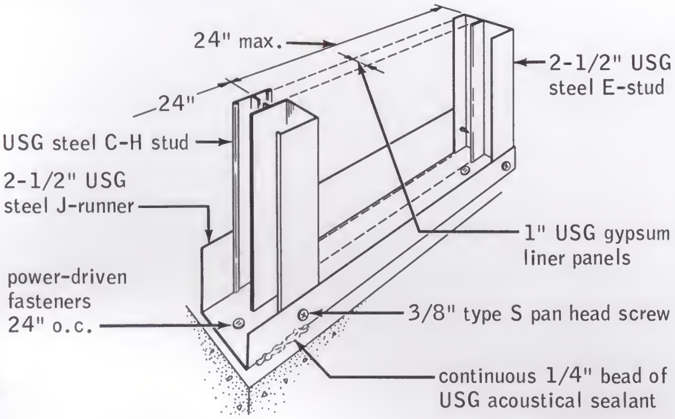
exterior wall intersection

Installation Directions

cavity separation wall

Foundation—Position 2½″-wide steel J-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24″ o.c. When sound control is required, caulk runner at foundation with ¼″ bead of USG Acoustical Sealant.

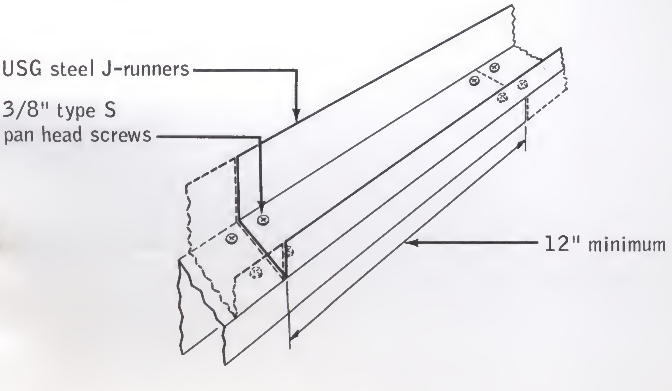
foundation-cavity wall


24" max.
24"
USG steel C-H stud
2-1/2" USG steel J-runner
power-driven fasteners 24" o.c.
2-1/2" USG steel E-stud
1" USG gypsum liner panels
3/8" type S pan head screw
continuous 1/4" bead of USG acoustical sealant

First floor—Install 1″ liner panels and steel studs cut to length 3″ more than floor-to-floor height. Erect liner panels vertically in J-runner with long edges in groove of C-H stud. Install C-H studs between panels and cap ends of run with E-stud (see detail). Fasten all studs at bottom to J-runner flange with ⅜″ type S screws.

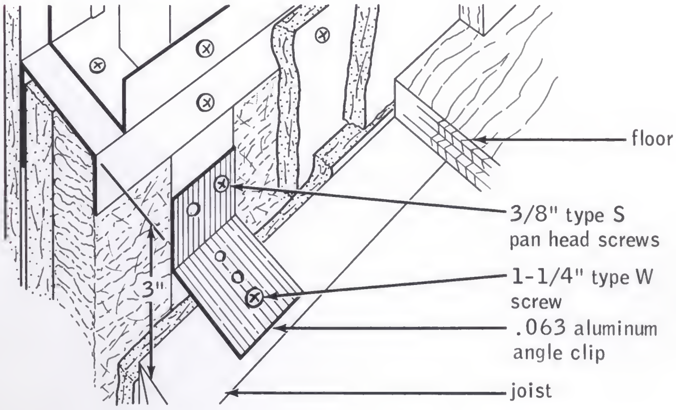
Intermediate floors — Cap top of panels and studs with J-runner and fasten studs to J-runner flanges with ⅜″ type S screws. Install bottom J-runner for next row of panels over top runner with end joints staggered at least 12″. Fasten runners together with double ⅜″ screws at ends and spaced 24″ o.c. (see detail). Secure each stud to framing with 0.063″ aluminum angle clips, fastened to studs with ⅜″ screws and to framing or subfloor with 1¼″ type W screws (see detail).

J-runner splice



Roof—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with J-runner and fasten studs to flanges with ⅜″ screws. Fasten studs to framing with aluminum clips.

intermediate floor-cavity wall



Sound attenuation blankets—Install blankets between studs and attach to liner panel with five 9⁄16″ staples driven through each blanket, one in center and others spaced 3″ from each corner. Butt ends of blankets closely and fill all voids.

Resilient channels—When specified, install RC-1 Resilient Channels horizontally to face side of studs, 6″ above floor 6″ below ceiling joists and max. 24″ o.c. Attach channels to studs with ⅜″ type S screws driven through holes in mounting flange. Extend channels to ends of runs and attach to E-studs. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice.

Gypsum panels—Apply ½″ SHEETROCK W/R FIRECODE "C" Gypsum Panels vertically to both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1″ type S screws spaced 12″ o.c. in field and along edges and runner flanges.

Resilient single-layer—Apply ½″ gypsum panels vertically to resilient channels and fasten with 1¼″ type S screws placed 6″ away from stud and 12″ o.c. Do not place screws directly over stud.

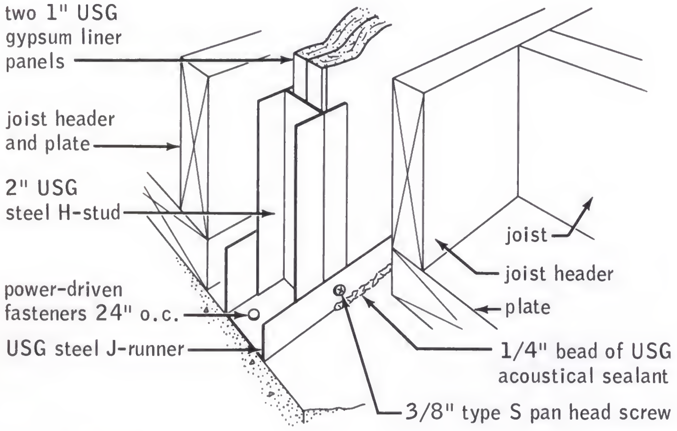
Resilient double-layer—Apply ⅝″ gypsum panel base layer horizontally to resilient channels with end joints staggered; fasten with 1¼″ type S screws placed 6″ away from stud and 12″ o.c. Apply ⅝″ gypsum panel face layer vertically over base layer and attach with 1⅝″ type S screws spaced 12″ o.c. and staggered from those in base layer.

Joint treatment—Complete the assembly with DURABOND Joint System applied according to manufacturer's current directions.

solid separation wall

Foundation—Position 2″-wide steel J-runner at floor with short leg toward installation side. Securely attach runner to foundation with power-driven fasteners at both ends and spaced 24″ o.c. Where sound control is required, caulk runner at foundation with ¼″ bead of USG Acoustical Sealant (see detail).

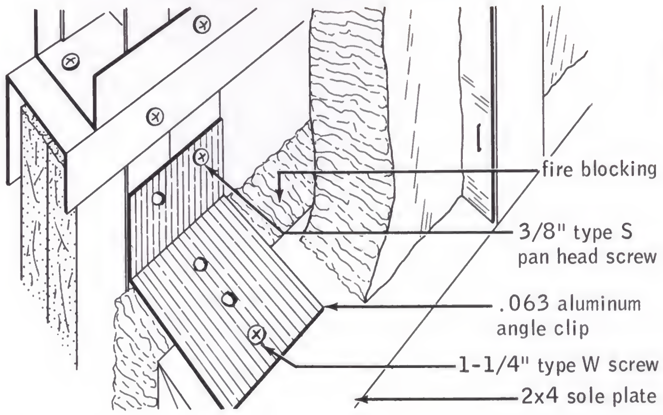
foundation-solid wall


two 1" USG gypsum liner panels
joist header and plate
2" USG steel H-stud
power-driven fasteners 24" o.c.
USG steel J-runner
joist
joist header
plate
1/4" bead of USG acoustical sealant
3/8" type S pan head screw

First floor—Install 1″ liner panels and steel studs cut to convenient length more than floor-to-floor height. Score and snap liner panels. Erect two thicknesses of 1″ liner panels vertically in J-runner with long edges in H-stud. Erect H-studs and double-thickness panels alternately until wall is completed. Install C-stud as cap at ends of run. Fasten all studs to J-runner flange with ⅜″ type S pan head screws. Install wood blocking between framing at mid-floor height, if necessary, to secure end cap against liner panels.

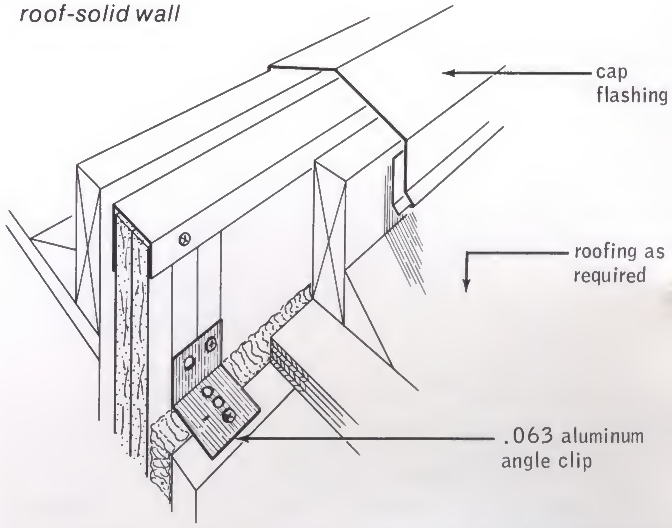
Intermediate floors — Cap top of panels and studs with back-to-back J-runners screw-attached together with double ⅜″ type S screws at ends and spaced 24″ o.c. (see detail). Fasten studs to runner flange with ⅜″ screws. Secure studs to framing with 0.063″ aluminum angle clips screw-attached to studs with ⅜″ screws and to framing with 1¼″ type W screws (see detail). Except at foundation, install fire blocking between joists and fire barrier.

intermediate floor-solid wall



Roof—Continue erecting studs and panels for succeeding stories as described above. At roof, cap panels with J-runner and fasten to studs with ⅜″ screws. Fasten studs to framing with aluminum clips.

roof-solid wall



Interior finish—Screw-apply single-layer ⅝″ SHEETROCK FIRECODE "C" Gypsum Panels to wood studs and joists or nail in conventional manner. Complete the assembly with DURABOND Joint System applied according to manufacturer's current directions.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE, THERMAFIBER, DURABOND.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

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SHEETROCK Gypsum Panels & Accessories

description and utility

There is only one Sheetrock—the interior wall and ceiling surface developed and improved by United States Gypsum. It is the product that in the last quarter-century, has revolutionized construction—to the point that today more than 90% of all new residential buildings are finished with gypsum panels. Systems using Sheetrock Gypsum Panels now have gained the same acceptance in commercial building.

Sheetrock is a mill-fabricated gypsum panel composed of a fireproof gypsum core encased in a heavy manila-finished paper on the face side and a strong liner paper on the back side. The face paper is folded around the long edges to reinforce and protect the core, and the ends are square-cut and finished smooth. In Sheetrock SW Gypsum Panels, an exclusive edge design strengthens the joint and reduces imperfections in finishing.

Gypsum panels are produced in specialized forms for various applications. Complementing these is the industry's broadest line of accessories, adhesives and joint treatment materials to provide complete partition, ceiling and floor assemblies. This catalog covers these products in five groups: (1) Gypsum Panel Products; (2) Trim Accessories; (3) Structural Accessories; (4) Screws and Adhesives; (5) Joint Treatment and Texture Products. A general specification appears on pages 10 to 12; performance and specification of assemblies using these components are covered in pertinent U.S.G. System Folders.

Interior walls and ceilings built with Sheetrock Panels gain a durable surface suitable for any type of decorative treatment and for repeated decoration during the life of the building. Joints between adjacent panels may be reinforced and concealed with a U.S.G. joint treatment system, or may be featured by leaving exposed or covering with decorative mouldings.

Dry Construction—factory-fabricated gypsum panels eliminate excessive moisture in construction.

Speed—Panels are easily cut and quickly applied.

Quick Decoration—essentially a "dry" material, Sheetrock Panels permit painting or other decoration, and the installation of metal or wood trim, almost immediately.

Fire Protection—the gypsum core will not support combustion or transmit temperatures greatly in excess of 212°F. until completely calcined—a slow process. See U.S.G. Construction Selector SA-100 for fire-resistance ratings.

Crack Resistance—with joints reinforced by one of the U.S.G. joint systems, Sheetrock SW Gypsum Panels form walls and ceilings exceptionally resistant to cracks caused by frame movement, vibration or minor settlement.

Non-Warping—expansion or contraction under normal atmospheric changes is negligible and does not cause harmful warping or buckling.

Availability—24 strategically located U.S.G. operating plants produce and/or stock the gypsum panel materials described here. Special distribution centers, in addition to these plants, increase total service efficiency to major markets and rural areas from coast to coast. All standard or specialty gypsum panel products may be considered readily available and easily procured upon short notice.

general limitations

1. Not recommended where exposure to moisture is extreme or continuous.

2. Must be adequately protected against wetting when used as a base for ceramic or other wall tile (see Foil-Back Sheetrock limitation). Sheetrock W/R Gypsum Panels are the recommended product for this purpose in partitions.

3. Maximum spacing of framing members: ½″ and ⅝″ Sheetrock Gypsum Panels are designed for use on framing centers from 16″ to 24″; ⅜″ and ¼″ Sheetrock, on centers up to 16″. In both walls and ceilings, when ½″ or ⅝″ Sheetrock Panels are applied across framing on 24″ centers and joints reinforced, headers are not required. ⅜″ and ¼″ Sheetrock not recommended for use on metal framing nor as base for spray-applied texture finish. For this finish, ½″ or ⅝″ Sheetrock Panels are applied across framing.

4. Application of Sheetrock over ¾″ wood furring applied across framing is not recommended since the relative flexibility of the furring under impact of the hammer tends to loosen nails already driven. Furring should be 2″ x 2″ minimum (may be nom. 1″ x 4″ if panels are to be screw-attached).

5. The application of Sheetrock Panels over an insulating blanket, that has first been installed continuously across the face of the framing members, is not recommended. Blankets should be recessed and the blanket flanges attached to sides of studs or joists.

6. To prevent objectionable sag in gypsum panel ceilings, the weight of overlaid unsupported insulation should be limited to a uniform load of 1.2 psf for ½″ thick panels and 1.4 psf for ⅝″ thick panels. A vapor barrier should be installed in all exterior ceilings, and the plenum or attic space properly vented.

technical data

Sheetrock Gypsum Panels comply with Federal Specification SS-L-30D; ASTM C36. Thermal coefficient of expansion (unrestrained): 9.0×10^{-6} in. per in. per deg. F. (40°—100°F); hygrometric coefficient of expansion (unrestrained): 5.4×10^{-6} in. per in. per % r.h. (5%—90% r.h.). Fire hazard classification: flame spread 15, fuel contributed 15, smoke developed 0.

types and functions

1. Gypsum Panel Products

Sheetrock Regular Gypsum Panels have long edges tapered on the face side to form a shallow channel for joint reinforcement. Made in four thicknesses for specific purposes:

—⅝″, recommended for the finest single-layer drywall construction. The greater thickness provides increased resistance to fire exposure and transmission of sound.

—½″, for single-layer application in residential construction.

—⅜″, lightweight, applied principally in the double wall system over wood framing and in repair and remodel work.

—¼″, a lightweight, low-cost, utility gypsum panel, used as base layer for improving sound control in double-layer steel and wood stud partitions and for use over old wall and ceiling surfaces.

Width: 4 ft.; length: 8, 9, 10, 12 or 14 ft. (except ¼″, available in 8 and 10-ft. lengths only); edges: tapered; finish: ivory manila paper, suitable for paint or other decoration.

Sheetrock SW Gypsum Panels have an exclusive eased-edge design to help minimize ridging or beading and other joint imperfections and help compensate for extremes of temperature and humidity during construction. The system produces the strongest joint ever developed.

This is accomplished by pre-filling gypsum panel joints with Durabond 90 Joint Compound, a formulation which chemically hardens in about 1½ hours, providing maximum bond and minimum shrinkage. The edge contour eliminates the need to crown joints, and no more compound is required than with regular panels. Taping and other application procedures are conventional.

Except for the eased edge, Sheetrock SW Panels are tapered like, and otherwise identical to, regular tapered-edge gypsum panels. Made in ⅝″, ½″ and ⅜″ thicknesses.

Where to use Sheetrock Gypsum Panels

(type)→	Regular	Regular and SW		FIRECODE		Foil-Back			TEXTONE Vinyl Panels	W/R Panels†
construction (thickness)→	¼″	⅜″	½″ & ⅝″	½″	⅝″	⅜″	½″	⅝″	⅜″, ½″ or ⅝″	½″ & ⅝″
WALLS										
Exterior Walls—Single Layer										
masonry (furred)			X	X	X		X	X		X
wood framing			X	X	X		X	X		X
rigid insulation board			X							X
Exterior Walls—Double Layer										
masonry (furred)										
base			X	X	X	X	X	X		
finish	X	X	X	X	X				X	
wood framing										
base			X	X	X	X	X	X		
finish	X	X	X	X	X				X	
Interior Walls—Single Layer										
over existing walls	X	X							X	
masonry (furred)			X	X	X					
wood framing			X	X	X					X
metal framing			X	X	X					X
masonry & concrete (direct)			X							X
Interior Walls—Double Layer										
masonry (furred)										
base			X	X	X					
finish			X	X	X				X	
wood framing										
base	X	X	X	X	X					
finish		X	X	X	X				X	
metal framing										
base	X		X	X	X					
finish			X	X	X				X	
CEILINGS										
Ceilings—Single Layer										
over existing ceiling	X	X								
wood framing		X	X	X	X	X	X	X		
metal framing			X	X	X		X	X		
Ceilings—Double Layer										
wood framing										
base		X	X	X	X	X	X	X		
finish		X	X	X	X					
metal framing										
base			X	X	X		X	X		
finish			X	X	X					
Ceilings—Acoustical Base										
over suspended metal grillage			X	X	X					
over channel or nailable steel studs			X	X	X					

†Recommended as a base for ceramic or other tile.

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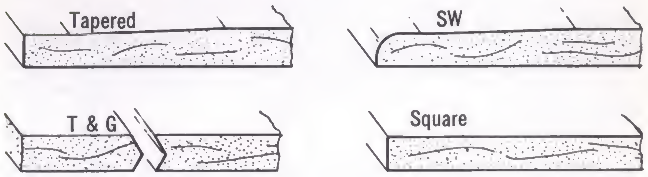
Pre-filling joints of SHEETROCK SW Gypsum Panels

Gypsum Panel Products—Types of Edges



Gypsum Panel Application and Frame Spacing

thickness	approx. weight psf.	location	application method	max. frame spacing c. to c.
⅜″ (1)	1.5	ceilings	horizontal	16″
⅜″ (1)	1.5	sidewalls	horizontal or vertical	16″
½″	1.9	ceilings	vertical horizontal	16″ 24″
½″	1.9	sidewalls	horizontal or vertical	24″
⅝″	2.4	ceilings	vertical horizontal	16″ 24″
⅝″	2.4	sidewalls	horizontal or vertical	24″

(1) For wood framing only

Bending of SHEETROCK Gypsum Panels

panel thickness	bending radii with dry panels	
	lengthwise	width
½″	20′ (1)	—
⅜″	7½′	25′
¼″	5′	15′

(1) Bending two ¼″ pieces successively permits radii shown for ¼″ SHEETROCK.
NOTE: By moistening the face and back paper thoroughly prior to application, and replacing in the stack for at least one hour, the panel may be bent to still shorter radii. When the panel dries thoroughly, it will regain its original hardness.

SHEETROCK FIRECODE Gypsum Panels, made in ⅝″ and ½″ thicknesses, combine all the advantages of SHEETROCK with additional resistance to fire exposure—the result of a specially formulated core containing special mineral materials.

Facings of special FIRECODE "C" Gypsum Panels have qualified for fire ratings of up to 2 hours in walls, 3 hours in ceilings, 4 hours for column protection previously obtained only with heavier assemblies. See U.S.G. Construction Selector for description of tested assemblies.

Limitations (also refer to General Limitations, page 1): (1) In order to attain fire-resistance ratings, the construction of the partition and/or floor and ceiling assemblies must conform to the panel designs as tested at the indicated fire testing facilities (see U.S.G. System Folders). (2) Maximum spacing of frame members: 24″ c. to c.

Width: 4 ft.; length: 8, 9, 10, 12 or 14 ft.; edges: eased, tapered; finish: ivory manila paper, suitable for paint, wallpaper or other decoration.

Foil-Back SHEETROCK is made by laminating special kraft-backed aluminum foil to back surface of regular or SHEETROCK SW panels. It is effective as a vapor barrier for exterior walls and ceilings when applied with foil surface next to the framing (1) in single-layer application, or (2) as the base layer in the double-layer system. A significant thermal insulating value is achieved when SHEETROCK is installed with the aluminum foil facing an air space of ¾″ minimum (for construction details, see U.S.G. Folder SA-923). The scuff-resistant metal foil reduces outward heat flow in winter, and inward heat flow in summer.

With Foil-Back SHEETROCK, the possibility of condensation within an exterior wall, and resulting exterior paint failures, is minimized. Meets ASTM requirements for a vapor permeability not exceeding 0.30 perm. **Limitation:** do not use as a base for ceramic or other tile. Thickness: ⅜″, ½″ and ⅝″. Sizes, edges and finish: same as regular panels.

SHEETROCK W/R Gypsum Panels are a proven water-resistant base for the adhesive application of ceramic and plastic tile and plastic-faced wall panels. Made water-resistant all the way through: (1) multi-layered face and back paper are chemically treated to combat penetration of moisture; (2) the gypsum core is made water-resistant with a special asphalt composition. The panel is easily recognized because of its distinctive green face.

Limitations: adherence to recommendations concerning sealing exposed edges, painting, tile adhesives, framing and installation is necessary for satisfactory performance (see Folder SA-924). Not recommended for application in ceilings or in remodeling unless applied directly to studs.

Available in plain core, ½″ and ⅝″ thickness; also in ½″ and ⅝″ SHEETROCK W/R FIRECODE "C" Gypsum Panels for applications where a fire rating is desired—listed under UL Label Service R-1319-84 with following design numbers applicable: 45-min. U317; 1-hr. U305; 2-hr. U301, U411. Fire hazard classification: flame spread 20, fuel contributed 5, smoke developed 0. Comply with ASTM C630. Width: 4 ft.; length: 8, 10 or 12 ft.; edges: tapered; finish: green treated manila paper, suitable for receiving tile, paint or wallpaper.

TEXTONE Panels are conventional gypsum panels with factory-applied vinyl facings in a wide range of coordinated decorator colors. The panels are used for predecorated permanent partitions, movable partitions or in remodeling. See U.S.G. Folder SA-928 for descriptions and specifications.

USG Coreboard has a 1″ thick fireproof gypsum core encased in strong, gray liner paper on both sides. It is used in vent shaft and laminated gypsum partitions with additional layers of gypsum panels applied to the coreboard to complete the wall assembly. Manufactured with "V" T&G edges for use in solid partitions or with square edges and prescored 6″ to 8″ o.c. Coreboard strips are then easily snapped and separated from this master unit. Thickness: 1″; width: 24″; edges: "V" T & G or square; length: 8, 9, 10 and 12 ft. (prescored—7 ft. 8 in. lengths only); finish: gray paper, unsuitable as exposed surface.

USG Shaft Wall Liner has a special gypsum core for added fire resistance and multi-layered green paper facings that are treated to resist moisture penetration. Used in USG Cavity Shaft Wall Partitions (see Folder SA-922) and Area Separation Walls (see Folder SA-924). Panels have beveled edges, are 1″ thick, 16″ and 24″ wide and are available in lengths up to 16 ft.

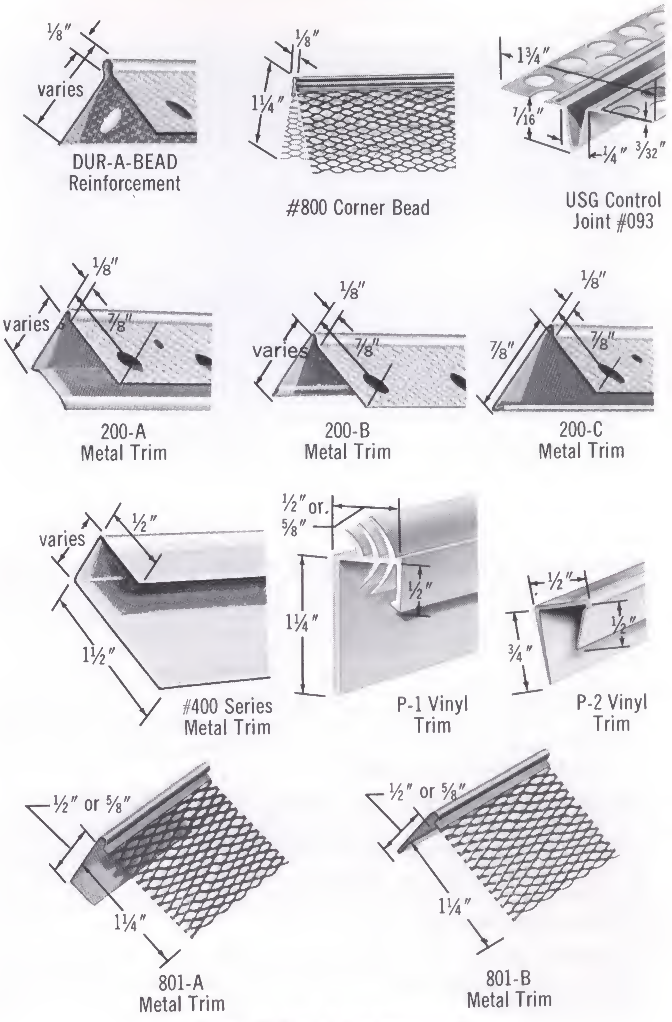
PYROROCK Sound Underlayment Board is a high-strength gypsum product for lightweight, dry installation over interior plywood subfloors. Nailed or screw-attached, it offers a superior base for directly applied carpet and pad, vinyl tile or other durable floor covering. Qualifies for 1-hr. combustible fire rating—UL Design L523. Fire hazard classification: flame spread 20, fuel contributed 0, smoke developed 0. When combined with a resiliently attached gypsum panel ceiling, the assembly meets HUD requirements for sound control in multi-family dwellings. Compared to wet systems, PYROROCK eliminates job delays for curing, reduces floor weight as much as 10 psf often reducing framing costs, and requires only a single plate at party walls. Thickness: ¾″; width: 48″; edges: square; length: 6 and 8 ft.; weight: 3.5 psf. **Limitation:** not recommended for bathrooms, laundry rooms or other locations where exposed to water.

USG Exterior Gypsum Ceiling Board is a weather-resistant board designed for use on the soffit side of eaves, canopies and carports and other commercial and residential exterior applications with indirect exposure to the weather. It is noncombustible, is simply scored and snapped for quick application, and offers excellent paintability. Most important are its sag- and water-resistance—which independent tests have shown superior to those of exterior grade plywood and structural laminated paper board. Fire hazard classification: flame spread 20, fuel contributed 5, smoke developed 0.

Installed conventionally in wood and metal-framed soffits; batten strips or moldings used over butt joints or joints treated; backing strips required for small vent openings. Has brown back paper and beige, water-repellent face paper. Thickness: ½″; width: 4′; lengths: 8 and 12 ft.; edges: eased. Also available in ⅝″ thick FIRECODE Exterior Ceiling Board with fire-rated core.

THERMAFIBER Insulation is a mineral fiber product ideal for improving sound control in partition and floor/ceiling constructions. **Insulating Blankets,** kraft paper enclosed, are used in wood frame construction. **M-S Blankets** are designed for insulating exterior furring and steel stud curtain wall assemblies. They are flangeless, open-faced on breather side and require separate vapor barrier. **Sound Attenuation Blankets** are a paperless, semi-rigid mineral fiber mat designed to improve STC ratings when installed within U.S.G. steel stud partitions (see Folder SA-705).

USG Exterior Gypsum Ceiling Board



DUR-A-BEAD Reinforcement

#800 Corner Bead

USG Control Joint #093

200-A Metal Trim

200-B Metal Trim

200-C Metal Trim

#400 Series Metal Trim

P-1 Vinyl Trim

P-2 Vinyl Trim

801-A Metal Trim

801-B Metal Trim

USG Trim Accessories

USG Gypsum Sheathing is a fireproof gypsum board, ½″ thick, with an asphalted gypsum core encased in specially formulated brown water-repellent paper on both sides and long edges. Its weather resistance, water repellence, fire resistance and low applied cost make it suitable for use in exterior curtain wall construction (see Folder SA-805); also a popular choice for wood-framed garden apartments and light commercial buildings. Available 24″ wide, 8-ft. length with V-shaped T&G long edges and 48″ wide, 8 and 9-ft. lengths with square edges.

USG Triple-Sealed Gypsum Sheathing is a low-cost structural sheathing for wood frame construction under many exterior finishes—masonry veneer, wood siding and shingles, stucco and composition siding. Triple-sealed with water-repellent paper on face, back and long edges, this fire-resistant gypsum board has untreated core but comes with ends coated with special waterproofing. Easily nailed to studs 16″ o.c.; meets HUD(FHA) requirements for omission of let-in corner bracing when properly installed. Available 4″ thick, 48″ wide, 8 and 9-ft. lengths with square edges.

2. USG Trim Accessories

Dur-A-Bead is an all-metal heavy gauge hot-dipped galvanized steel reinforcement for protecting external corners. It is nailed to framing through gypsum panels and concealed with U.S.G. joint compounds as a smooth, finished corner. Available in three flange widths: **No. 101** 1″x1″; **No. 103** 1¼″x1¼″; **No. 104** 1⅛″x1⅛″.

No. 800 Corner Bead is a galvanized steel external corner reinforcement with 1¼″ wide fine-mesh expanded flanges. Nailed or stapled to framing through panels; provides superior key for joint compounds and eliminates shadowing.

USG Control Joint No. 093 is used to relieve stresses of expansion and contraction across the joint in large ceiling and wall areas. Used from floor to ceiling in long partition runs, and from door header to ceiling. Made from roll-formed zinc with a tape-protected ¼″ opening 7⁄16″ deep. Lengths: 8 and 10 ft. **Limitation:** where sound and/or fire ratings are prime considerations, an adequate seal must be provided behind the control joint.

USG Metal Trims provide protection and neat finished edges to gypsum panels at window and door jambs, at ceiling angles and at intersections where panels abut other materials. Easily installed by nailing through the channel and panels into the framing or jamb. Eliminate precision cutting and mitering; joints are simply butted together. Finished with U.S.G. joint compounds (except P-1, P-2, #400 and RP series). Made in following types and sizes:

#200 series—steel casing, includes **No. 200-A** U-shaped channel in ½″ and ⅝″ sizes; **No. 200-B** L-shaped angle edge trim without back flange to simplify application, in ½″ and ⅝″ sizes; **No. 200-C** L-shaped trim, requires slotted jamb for installation in most cases, open "V" edge of flange inserts into ⅛″ kerf to make trim adjustable for use with ⅜″, ½″ and ⅝″ gypsum panels.

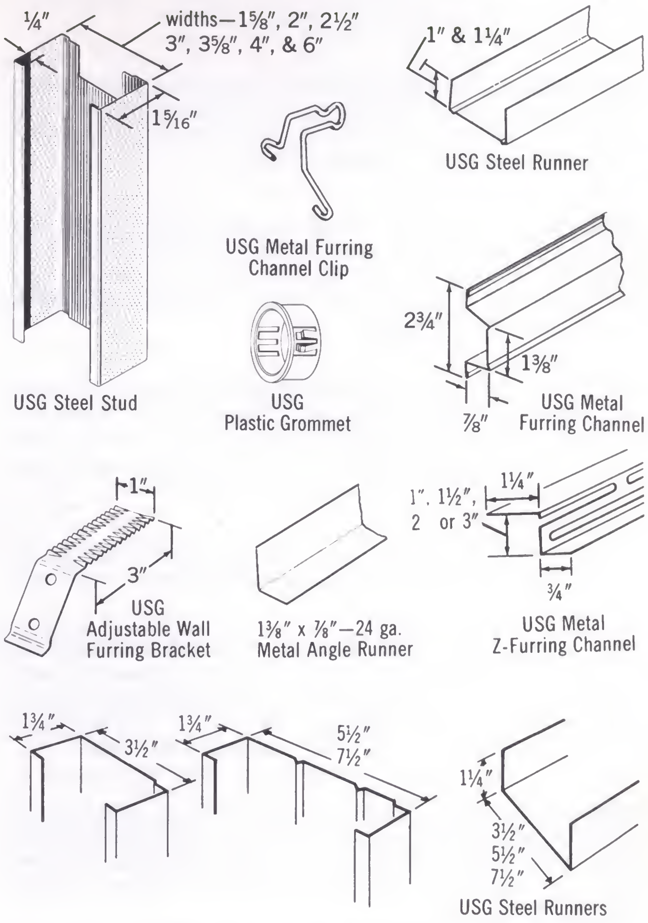
#400 series—reveal type all-metal trim, requires no finishing compound, includes **No. 400** in ⅜″ size, **No. 401** in ½″ size, **No. 402** in ⅝″ size.

#800 series—all-metal trim with expanded flanges used to provide edge protection at cased openings and ceilings or wall intersections. Includes **801-A** channel-type and **801-B** L-shaped trim, both in ½″ and ⅝″ sizes.

USG P-1 Vinyl Trim is a reveal type, white plastic trim with flanges and web of rigid vinyl and integral flexible vinyl fins that compress on installation. Fins form permanent flexible seal to effectively block sound, replace caulking, provide structural stress relief at panel perimeter. Fits tightly over panel edge; requires no finishing compound; paints easily; includes **P-1A** in ½″ size, **P-1B** in ⅝″ size.

USG P-2 Vinyl Trim is a channel-shaped vinyl trim with a pressure-sensitive adhesive backing for attachment to the wall at wall-ceiling intersections. Provides positive perimeter relief in radiant heat ceiling systems. Length: 10 ft.

USG Resilient Vinyl Trim (RP Series) is precision-made of vinyl plastic in solid colors: ivory, tan, chocolate and black. Available for ⅜″, ½″ and ⅜″ thick panels; lengths: 8, 9, 10 ft.; shapes: RP-1 Outside Corner, RP-2 Inside Corner, RP-3 Divider, RP-4 End Cap, RP-5 Snap-on Corner, RP-7 Snap-on Batten.


¼″
widths—1⅝″, 2″, 2½″ 3″, 3⅝″, 4″, & 6″
1⁵⁄₁₆″
USG Steel Stud
USG Metal Furring Channel Clip
USG Plastic Grommet
1″ & 1¼″
USG Steel Runner
2¾″
1⅜″
⅞″
USG Metal Furring Channel
1″
3″
USG Adjustable Wall Furring Bracket
1⅜″ x ⅞″—24 ga. Metal Angle Runner
1″, 1½″, 2 or 3″
1¼″
¾″
USG Metal Z-Furring Channel
1¾″
3½″
1¾″
5½″
7½″
1¼″
3½″
5½″
7½″
USG Steel Runners

USG Structural Accessories

3. Structural Accessories

USG Steel Studs and Runners, channel-type and roll-formed from galvanized steel, are designed for screw attachment of ½″ and ⅝″ Sheetrock Gypsum Panels and USG Gypsum Sheathing. They are strong, non-load bearing components of interior drywall partitions, ceilings and column fireproofing and as framing for exterior curtain wall systems. Limited chaseways for electrical plumbing services are provided by punchouts in the stud web. Assemblies using these studs are low in cost and offer excellent sound and fire-resistance characteristics. Available in various styles and widths to meet functional requirements outlined below:

Interior Partitions, Ceilings, Column Fireproofing—ST5 and ST10 stud styles in seven widths—1⅝″, 2″, 2½″, 3″, 3⅝″, 4″, 6″—and lengths 8 to 16 ft. Runners come in stud widths, 12-ft. length. For structural properties, see U.S.G. Folder SA-923.

Exterior Curtain Wall—studs are available to meet various height requirements and in nine widths—2″, 2½″, 3″, 3½″, 3⅝″, 4″, 5½″, 6″, 7½″—lengths up to 28 ft. Runners come in stud widths (with 1¼″ unhemmed leg), 10-ft. lengths. See U.S.G. Folder SA-805 for stud styles, structural and physical properties and limiting heights.

Studs and Runners Style ST5 comply with ASTM C645; materials for Style ST10 comply with Fed. Spec. QQS-698 and QQS-775d, Class d.

USG Metal Angle Runners are 1⅜″x⅞″x24-ga. galvanized steel angle sections used to secure and brace 1″ coreboard in laminated gypsum partitions. Length: 10 ft.

USG Metal Furring Channels are ceiling and wall channels made of galvanized steel designed for attachment of ½″ and ⅝″ gypsum panels with USG Brand Type S Screws. Face width: 1⅜″; depth: ⅞″; length: 12 ft.

USG Furring Channel Clips are made of galvanized wire and used in attaching Metal Furring Channels to 1½″ cold-rolled runner channels. They are installed on alternate sides of the carrying channels; where clips cannot be alternated, wire tying is recommended.

USG Z-Furring Channels are used to mechanically attach rigid insulation board or Z-furring blankets and SHEETROCK Gypsum Panels to monolithic concrete and masonry walls (see U.S.G. Folder SA-923). Made of hot-dipped galvanized steel; furring depths: 1″, 1½″, 2″, 3″; length: 8′-6″.

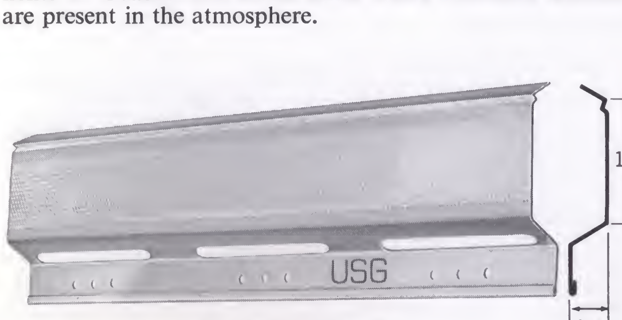
USG Plastic Grommets snap into 1¼″ round holes of USG Steel Studs to provide positive electrical insulation of wiring.

USG Adjustable Wall Furring Brackets are used for attaching ¾″ furring channels to exterior masonry walls. Made of 20-ga. galvanized steel with corrugated edges, they are wire-tied to horizontal stiffeners, 24″ o.c., in braced furring systems: fur out board ¼″ to 2¼″ plus channel depth.

USG Cold-Rolled Channels, made of 16-ga. steel, are used for furring, and in suspended ceilings and partition construction. Available either galvanized or black asphaltum painted. Sizes: ¾″, with ½″ flange; 1½″, with ¹⁹⁄₃₂″ flange. Lengths: 16 and 20 ft.

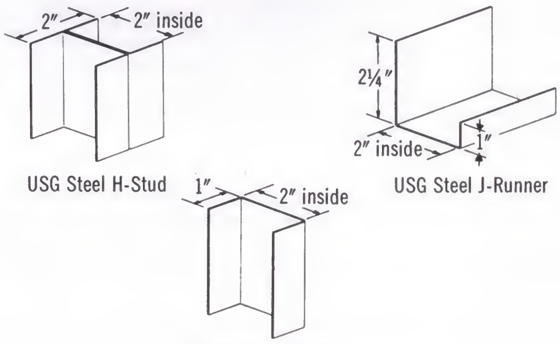
RC-1 SHEETROCK Resilient Channel is a galvanized steel channel which provides for resilient attachment of gypsum panels to wood framing. Widely used to improve sound transmission loss in partitions and ceilings of garden-type apartments, motels and other structures (see U.S.G. Construction Selector). Prepunched holes in the flange facilitate screw fastening to framing members; panels are attached to channel with USG Brand Type S Screws. Width: 2⅝″; depth: ½″; length: 12 ft. **Limitation:** not for use beneath highly flexible floor joists; should be attached to ceilings only with 1¼″ USG Brand Type W or S Screws; see Wood Framing Requirements, page 10.

Note: Refer to Notes to Architect, page 10, for recommendations concerning use and storage of light-gauge metal components in Coastal and other areas where corrosive elements are present in the atmosphere.



RC-1 Resilient Channel

Steel Components for Shaft Walls and Area Separation Walls

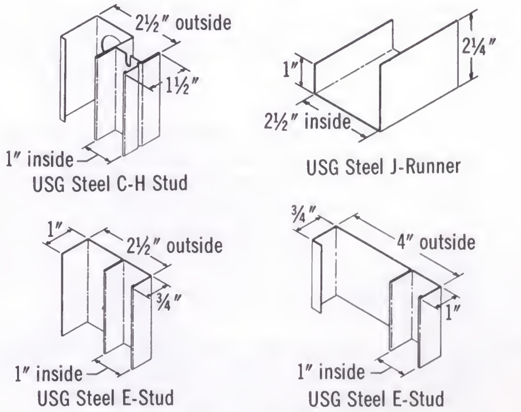


USG Steel H-Stud

USG Steel J-Runner

USG Steel C-Stud

USG Solid Wall Systems



USG Steel C-H Stud

USG Steel J-Runner

USG Steel E-Stud

USG Steel E-Stud

USG Cavity Wall Systems

USG Steel Components for Shaft Walls and Area Separation Walls are formed from hot-dipped galvanized steel meeting ASTM A446-67, Grade A with 1¼ oz. per sq. ft. zinc coating (see U.S.G. Folders SA-922 and SA-924). Items are color-coded at factory to indicate style as follows: ST5 white; ST7 green; ST8 blue; ST10 red; ST13 yellow; ST16 black. Two groups:

Cavity Wall Components are made from galvanized steel for use with 1″ thick USG Shaft Wall Liner. **USG Steel J-Runners** used as floor and ceiling runners and for elevator door framing are made with unequal legs in 2½″ and 4″ widths; styles: 212JR7, 400JR7; length: 10 ft. **USG Steel C-H Studs** are rigid roll-formed sections specially shaped to engage 1″ liner panels. Widths: 2½″ and 4″; styles: 212CH5, 212CH8, 400CH5, 400CH10; lengths as required. **USG Steel E-Studs** are used singly to cap partition or both sides of closure panel; widths: 2½″, 4″ and 6″; styles: 212ES5, 212ES10, 400ES5, 400ES10, 600ES5, 600ES10; lengths as required.

Solid Wall Components are made for use with two thicknesses of 1″ thick USG Shaft Wall Liner in Area Separation Walls. **USG Steel J-Runners** are used as floor and ceiling runners and back-to-back between liner panels at intermediate floors. Width: 2″; style: 200JR7; length: 10 ft. **USG Steel H-Studs** slide over and engage edges of adjacent liner panels. Width: 2″; styles: 200HS7, 200HS8, 200HS10, 200HS13, 200HS16; length: 8 to 16 ft. **USG Steel C-Studs** are used singly to cap partition or back-to-back both sides of closure panels. Width, styles and length same as for H-Studs.

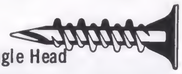
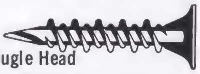
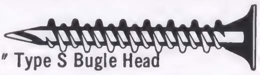
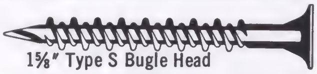
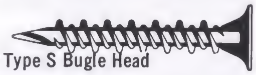
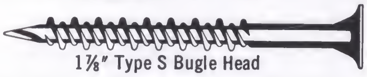
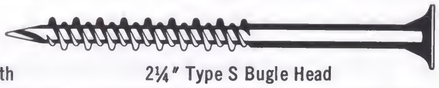
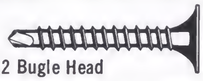
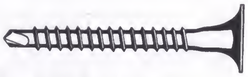
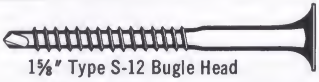
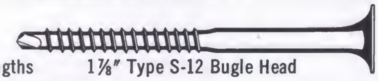
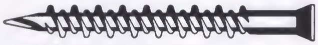
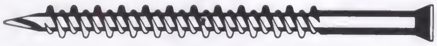
4. USG Screws, Adhesives and Sealants

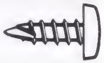
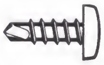
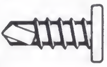
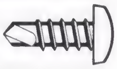
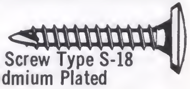
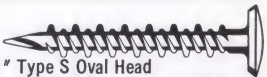
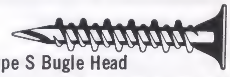
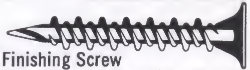
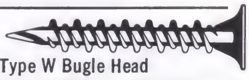
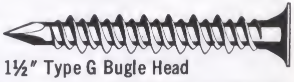
USG Brand Screws are aimed at producing the best possible attachment of Sheetrock Gypsum Panels. Their development not only has improved installation methods but has made possible today's broad selection of drywall systems applied over steel framing. Screws must be used with such systems, with the exception of ⅝″ panels applied to steel nailing channels, where annular ring nails may be used.

The superior holding power of drywall screws has virtually eliminated loose panel attachment and consequent problems of "nail pops" in wood frame construction. Fewer screws than nails are generally required, and speed of installation compares favorably with nailing when electric screwguns are used. Fracturing of the gypsum core and damage to face paper are minimized. Tests have shown USG Brand Screws to have 350% greater withdrawal resistance than GWB-54 nails.

Today's complete U.S.G. line of self-drilling, self-tapping steel screws includes types with a double lead thread design which produces up to 30% faster penetration, less screw stripping, and greater holding power than conventional fasteners. Comply with ASTM C646.

Selector Guide For USG Brand Screws

Fastening Application	Fastener Used
GYPSUM PANELS TO STEEL FRAMING (1)	
½″ single layer panels to steel studs, runners, channels	 ⅞″ Type S Bugle Head
⅝″ single layer panels to steel studs, runners, channels	 1″ Type S Bugle Head
½″ double layer panels to steel studs, runners, channels	 1 5/16″ Type S Bugle Head
⅝″ double layer panels to steel studs, runners, channels	 1⅝″ Type S Bugle Head
1″ coreboard to metal angle runners in solid partitions	 1¼″ Type S Bugle Head
½″ panels through coreboard to metal angle runners in solid partitions	 1⅞″ Type S Bugle Head
⅝″ panels through coreboard to metal angle runners in solid partitions. Also available in 2⅝″ length	 2¼″ Type S Bugle Head
GYPSUM PANELS TO 12-GA. (MAX.) STEEL FRAMING	
½″ and ⅝″ panels and gypsum sheathing to steel studs and runners	 1″ Type S-12 Bugle Head
USG Self-Furring Metal Lath through gypsum sheathing to steel studs and runners. Also available in hex washer and pancake head ULTRAWALL Panels to studs and runners	 1¼″ Type S-12 Bugle Head
½″ and ⅝″ double layer gypsum panels to steel studs and runners	 1⅝″ Type S-12 Bugle Head
Multi-layer gypsum panels to steel studs and runners Also available in 2″, 2⅜″, 2⅝″ lengths	 1⅞″ Type S-12 Bugle Head
WOOD TRIM TO INTERIOR STEEL FRAMING	
Wood trim over single layer panels to steel studs, runners. Also available in 1″ length and Type S-12	 1⅝″ Type S Trim Head
Wood trim over double layer panels to steel studs, runners	 2¼″ Type S Trim Head

Fastening Application	Fastener Used
STEEL STUDS TO DOOR FRAMES, RUNNERS	
Steel studs to runners	⅜″ Type S Pan Head Also available with hex washer head 
Steel studs to door frame jamb anchor clips Steel studs to runner Other metal-to-metal attachment (12-ga. max.)	 ⅜″ Type S-12 Pan Head
Steel studs to door frame jamb anchor clips (heavier shank assures entry in clips of hard steel)	½″ Type S-12 Low-Profile Head Also available in hex washer or pan head 
Strut studs to door frame clips, rails, other attachments in ULTRAWALL movable partitions	½″ Type S-16 Pan Head Cadmium Plated 
TRIM AND ACCESSORIES TO STEEL FRAMING	
Door hinges and trim to door frame Aluminum trim to steel framing (screw matches hardware and trim)	 ⅞″ Finishing Screw Type S-18 Oval Head Cadmium Plated
Cabinets to steel studs and resilient channels	 1¼″ Type S Oval Head Also available in 1⅝″ and 2¼″ length
Batten strips to steel studs in Demountable partitions	 1⅛″ Type S Bugle Head
Aluminum trim to interior steel framing in Demountable and ULTRAWALL partitions	 1¼″ Finishing Screw Type S Bugle Head Cadmium Plated
GYPSUM PANELS TO WOOD FRAMING	
⅜″, ½″ and ⅝″ single layer panels to wood framing	 1¼″ Type W Bugle Head
RC-1 RESILIENT CHANNEL TO WOOD FRAMING	
Screw attachment required for ceilings, recommended for partitions	1¼″ Type W, ⅞″ or 1″ Type S Bugle Head (see details above)
For fire-rated construction	1¼″ Type S Bugle Head (see details at left)
GYPSUM PANELS TO GYPSUM PANELS	
Multi-layer adhesively laminated gypsum to gypsum partitions (not recommended for double layer ⅜″ panels)	 1½″ Type G Bugle Head

Notes: (1) Includes USG Steel Studs and Runners, Styles 5 through 10; Metal Angle Runners; Metal Furring Channels; RC-1 Resilient Channels. If channel resiliency makes screw penetration difficult, use screws ⅛″ longer than shown to attach panels to RC-1 channels. For other styles of studs and runners, always use Type S-12 screws. For steel applications not shown, select a screw length which is at least ⅜″ longer than total thickness of materials to be fastened. USG Brand Screws are manufactured under U.S. Patent Nos. 2,871,752; 3,056,234; 3,125,923; 3,207,023; 3,221,588; 3,204,442; 3,260,100.

Spreader application of adhesive

USG Drywall Adhesives make an important contribution to gypsum panel attachment where the finest room interiors are desired. Their use greatly reduces the nail or screw fastening otherwise required, thus saves labor on spotting and sanding—also minimizes nail pops and other fastener imperfections.

Recommended for laminating gypsum panels in multi-layer fire-rated or non-rated partitions and ceilings are **DURABOND Joint Compounds**—dry powder products, applied by spreader, requiring mixing and temporary fastening in application. Provide tight bond when dry, yet permit adjustment of panels after contact.

In addition, ready-to-use **DURABOND Adhesives** are available in five types:

DURABOND 200 Adhesive—a solvent-base material, applied in ⅜″ beads, for gypsum panel application to wood or metal framing. May be used with Foil-Back SHEETROCK Panels. Bridges minor framing irregularities; requires minimum field fasteners on ceilings; meets ASTM C557-73.

DURABOND 300 Adhesive—a water-base material, applied in beads, for gypsum panel application to wood framing. Bridges framing irregularities; requires a minimum of permanent fasteners in field of panels. Meets ASTM C557-73.

DURABOND 500 Adhesive—a water-base material, for application of prefinished wall paneling to existing wall surfaces. Also used for laminating gypsum panels and backing boards to monolithic concrete, concrete block and wood fiber sound deadening board in non-fire rated construction. Applied by spreader in strips at center and both edges of panel; strips consist of ¼″x¼″ beads spaced 2″ o.c. Allows board adjustment after erection; provides excellent bond after impacting. Field fasteners not required when panels are prebowed.

DURABOND 600 Adhesive—a water-base liquid contact adhesive for laminating gypsum panels in non-fire rated double layer systems. Roller applied, bonds tightly with impacting. Ceilings only require a minimum of permanent fasteners.

DURABOND Multi-Purpose Adhesive—a high-strength, waterproof, rubber-base material applied in beads, for installing plywood subflooring; plywood, hardboard, or gypsum wall panels; and other finish work. Bonds to most construction surfaces—wood, concrete, concrete block, galvanized steel and aluminum. Meets ASTM C557-73 and American Plywood Assn. Specification AFG-01.

DURABOND Adhesive Selector Chart

applied surface ⟶	SHEETROCK Panels			TEXTONE Panels
base surface	Reg.	Foil-Back	W/R	
SHEETROCK Gypsum Panels, Gypsum Coreboard	500, 600 or M-P†	N/R	N/R	500 or 600
Foil-Back SHEETROCK Gypsum Panels	500, 600 or M-P†	N/R	N/R	N/R
Wood Studs, Joists and Furring	300, 200 or M-P	200 or M-P	300, 200 or M-P	300 or 200
Steel Studs, Joists and Furring Channels	200 or M-P	200 or M-P	200 or M-P	200
Unit Masonry (brick, stone, concrete block), Concrete	500 or M-P	N/R	500 or M-P	500
Painted Surfaces (clean, smooth, sound)	500 or M-P	N/R	500	500

†For fire rating, use DURABOND Joint Compounds. N/R—Not a regular or recommended application. M-P—DURABOND Multi-Purpose Adhesive.

DURABOND Vinyl Foam Tape is used in conjunction with DURABOND 200, 300, 500 and Multi-Purpose Adhesives for application of gypsum panels to wood or metal framing, gypsum backing board, sealed plaster, monolithic concrete, and concrete block. Designed for temporary attachment of panels until adhesive attains ultimate strength. Double-faced with pressure-sensitive adhesive for contact bond.

USG Acoustical Sealant is a highly elastic, water-base caulking for sound-rated partition and ceiling systems. Non-bleeding and staining, pumpable and easily applied in beads. Provides excellent adherence to most surfaces, permanent flexibility and long-lasting seal.

Also available is **SHEETROCK Brand W/R Sealant,** applied to all cut edges and nail heads of special SHEETROCK Water-Resistant Panels used in high-moisture room areas to protect the gypsum core from moisture penetration.

For complete application specifications, see pertinent U.S.G. System Folders or adhesive application directions.

5. Joint Treatment and Texture Products

Today's complete U.S.G. joint treatment line includes both ready-mixed and powder products in drying and hardening types. All are non-asbestos formulations which meet OSHA requirements. In addition to conventional joint finishing and fastener spotting, certain of these products are designed for repairing cracks, patching, spackling, back-blocking, texturing and for laminating gypsum panels in double-layer systems. These products meet ASTM C475 and Federal Specification SS-J-570a—Type I for joint compounds and Type II for tape.

U.S.G. also produces the industry's broadest line of texture finishes to provide distinctive appearance and surface decoration to gypsum panel walls and ceilings. A full line of both ready-to-use and powder products are offered to create fine, medium or coarse textures, sand or simulated acoustical finishes and interesting flat ripple, "orange peel" or light to medium stipples. For available texture products, often applied by the same trade which finishes gypsum drywall, refer to USG Paint Products Folder SA-933.

general limitations

1. U.S.G. joint compounds are not compatible with asbestos-type compounds and should not be intermixed or used together.

2. For interior use only; not recommended for laminating (except DURABOND Compounds).

3. Protect bagged and cartoned products against wetting; protect ready-mixed products from freezing and extreme heat.

4. Each compound coat must be dry before the next is applied (except DURABOND Compounds), and completed joint treatment must be thoroughly dry before decorating.

PERF-A-TAPE Reinforcing Tape is a strong, cross-fibered paper tape with minimal longitudinal stretch and superior tensile strength. Spark-perforated to allow air escape during embedding; lightly pre-creased for corner application. For estimating purposes: for 1,000 sq. ft. of surface area to be finished, approximately 370 lin. ft. of tape and 50 to 60 lb. of powder-type or 75 lb. of ready-mixed type joint compound are required.

Ready-Mixed Compounds

Exclusive with U.S.G., Crater Free Ready-Mixed Joint Compounds are vastly superior to ordinary ready-mixed compounds and are preferred for consistently high-quality work. These non-asbestos vinyl-based formulations are specially premixed to a creamy, smooth consistency essentially free of crater-causing air bubbles. They offer excellent slip and bond, easy workability. Used direct from the container without mixing, thinning or retempering. Available in either regular, hand or tool consistency; on-the-wall cost averages the same as with powder compounds. **Limitations:** must protect wet joints and container from freezing; not recommended for laminating.

USG Crater Free Ready-Mixed Joint Compound-Taping is a high-performance product for embedding tape and as a first fill coat over metal bead, trim and fasteners.

USG Crater Free Ready-Mixed Joint Compound-Topping is a low-shrinkage, easily applied and sanded product recommended for second and third coats over USG Ready-Mixed Taping and All Purpose Compounds. Also used as first coat over metal corners, trim and fasteners. Excellent for texturing or skim coating. Not suitable for embedding tape.

USG Crater Free Ready-Mixed Joint Compound-All Purpose, used for embedding, finishing and texturing. Combines, single-package convenience with good taping and topping characteristics. Recommended for finishing SHEETROCK SW Gypsum Panel joints over DURABOND 90 pre-fill coat and for finishing over DURABOND Taping Compound; also for repairing cracks in interior plaster and masonry not subject to moisture.

Vinyl-Base Powder Joint Compounds

USG Powder Joint Compounds are top-quality, non-asbestos, conventionally drying products providing easy mixing, smooth application and ample working time. Designed for embedding tape; for fill coats and finishing over drywall joints, corner bead, trim and fasteners, they offer controlled shrinkage to reduce edge cracking. Also used for simple texture finishes for decorating variety; will not cause alkali burning of paint.

USG Joint Compound-Taping is designed for embedding tape and for first fill coat on metal beads, trim and fasteners; also used for patching plaster cracks. Outstanding bond and resistance to tape cracking.

USG Joint Compound-Topping is a smooth-sanding material for second and third coats over taping compound. Produces excellent feathering and superior finishing results.

USG Joint Compound-All Purpose incorporates good taping and topping characteristics in a single product, for use where finest results of the specialized compounds (above) are not necessary. Also has good texturing properties.

DURABOND Joint Compounds

These hardening-type powder products were developed to provide faster finishing of drywall interiors, even under slow drying conditions. Rapid chemical hardening and low shrinkage permit same-day finishing and usually next-day decoration. Low shrinkage and superior bond are outstanding features: ideal for laminating double-layer systems, particularly fire-rated assemblies. Also used to embed tape and fill beads in veneer finish systems when rapid drying conditions exist. **Limitation:** DURABOND Joint Compound-Taping and 90 are not to be used as finishing coat; must always be completely covered with final application of USG or Ready-Mixed Joint Compound-All Purpose or Topping.

DURABOND Joint Compound-Taping is preferred for embedding tape and metal accessories; also ideal for heavy fills because it chemically hardens in 3 to 6 hours. Virtually unaffected by humidity.

DURABOND 90 Joint Compound with a 1 to 2-hour hardening time is an ideal alternate to DURABOND Joint Compound-Taping in applications where quicker finishing or laminating are desired. Required as pre-fill material for SHEETROCK SW Gypsum Panels.

DURABOND XL Joint Compound is a distinctively superior product designed to treat joints, fasteners, drywall beads and trims, and areas requiring heavy fills in USG Exterior Gypsum Ceiling Board application. Hardens in 30 to 60 minutes; offers outstanding properties of bond, moisture resistance, edge-crack resistance and low shrinkage.

Concrete Finishing Compound

COVER COAT Compound is a vinyl-base product, designed for filling and smoothing monolithic concrete ceilings and

columns located above grade—no extra bonding agent needed. Supplied in ready-mixed form (sand can be added), easily applied with drywall tools in two or more coats. Dries to a fine white surface usually making further decoration unnecessary on ceilings. **Limitations:** not to be applied over moist surfaces or surfaces likely to become moist (by condensation or otherwise), on ceiling areas below grade, on surfaces which project outside the building, or on other areas which might be subject to moisture, freezing, efflorescence, pitting or popping.

Wood Framing Requirements: wood framing meeting the following minimum requirements is necessary for proper performance of all gypsum drywall fasteners.

1. Framework should meet the minimum requirements of HUD/FHA and local building codes.

2. Framing members should be straight, true, of uniform dimension, and framing should be properly aligned.

3. All framing lumber should be of a good grade for the intended use, and 2″ x 4″ nominal size or larger should bear the grade mark of a recognized inspection agency using grading rules for lumber recommended by American Lumber Standards Committee.

4. All framing lumber should have a moisture content not in excess of 15% at time of gypsum panel application.

5. Do not attach gypsum panels to extremely soft framing members.

Failure to observe these minimum framing requirements, which are applicable to screw, nail and adhesive attachment, will materially increase the possibility of ineffective fastening concealment, due to warping or dimensional changes. This is particularly true if framing lumber has greater than normal tendencies to warp or shrink after erection.

Heating and Ventilation Recommendations: framing should approach as closely as possible the moisture content it will reach in service by allowing the building, after it is enclosed, to stand as long as possible prior to the application of the gypsum panels. Provide heat in winter or during damp conditions at a uniform temperature in the range of 50° to 70°F. Provide ventilation to remove excess moisture.

general drywall specifications

notes to architect

The following comments and recommendations cover the basic specifications for normal job requirements, and are intended as minimum guide specifications which can be adapted to specific projects and conditions.

Detailed specifications on the various drywall systems are covered in pertinent U.S.G. System Folders. Other related job conditions should be covered in the plans, details, or specifications.

It is not intended that these specifications cover every possible design or job condition, but rather to assist in the preparation of specifications applicable to a given project.

For fire ratings and sound transmission loss data of various assemblies, see U.S.G. Construction Selector.

For painting specifications, see U.S.G. Folder SA-933.

When Back-Blocking or Floating Interior Angle construction is to be specified, see specifications in U.S.G. Folder SA-924.

It is important that light-gauge metal components such as steel studs and runners, furring channels and resilient channels be given adequate protection in the warehouse or on the jobsite against rusting caused by moisture. In marine areas such as the Caribbean, Florida and the Gulf Coast where chloride as well as sea salt is present in combination with excessively high humidity, it is recommended that components be used which offer increased protection against corrosion.

Temperature differentials in an exterior wall may cause interior condensation which when combined with airborne dust could result in photographing or shadowing over fasteners and furring. Because soiling and temperature differences are variables over which it has no control, United States Gypsum cannot be held responsible for surface blemishes that result. Where temperature, humidity and soiling conditions are expected to cause objectionable blemishes, free-standing furring is recommended.

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. **Gypsum Panels** (in lengths as long as practical to minimize number of joints):

(Sheetrock Regular, SW, Firecode, Firecode "C", Foil-Back) Gypsum Panels (thickness).

(Textone Vinyl Panels) (type) (color or pattern).

(Sheetrock W/R Gypsum Panels) (type) (thickness).

b. **Gypsum Coreboard:** USG Coreboard (length).

c. **Gypsum Sheathing:** (USG Gypsum Sheathing, USG Triple-Sealed Gypsum Sheathing) (size).

d. **Exterior Ceiling Board:** USG Exterior Gypsum Ceiling Board.

e. **Pyrorock Sound Underlayment Board** (length).

f. **Corner Reinforcement:** (Dur-A-Bead No. 101, 103, 104) (No. 800).

g. **Metal Trim:** USG Metal Trim No. (200-A ½″ or ⅝″, 200-B ½″ or ⅝″, 200-C, 400, 401 or 402, 801-A ½″ or ⅝″, 801-B ½″ or ⅝″).

h. **Plastic Trim:** USG (P-1) (P-2) (RP Series), Vinyl Trim.

i. **Resilient Channels:** RC-1 Sheetrock Resilient Channel.

j. **Steel Studs:** USG Steel Studs (style) (length), (USG Plastic Grommets).

k. **Steel Runners:** USG Steel Runners (style) (length).

l. **Metal Furring Materials:** (USG Metal Furring Channels and Clips) (USG Adjustable Wall Furring Brackets) (USG Cold-Rolled Channels ¾″ or 1½″) (USG Z-Furring Channels).

m. **Drywall Screws:** (length) (USG Brand Screw Type S, S-12, S-16, S-18, W or G).

n. **Drywall Nails:** (length) (type) (USG Matching Color Nails to match finish of Textone Vinyl Panels) (conforming with "Recommended Performance Standards for Nails for Gypsum Wallboard", adopted by the Gypsum Association and the iaWCC/GDCI) (as specified in fire-resistive construction).

o. **Control Joints:** USG Control Joint No. 093.

p. **Drywall Adhesives:** (Durabond Joint Compound-Taping or 90) (Durabond 200, 300, 500, 600, Multi-Purpose Adhesive) (Durabond Vinyl Foam Tape).

q. W/R Sealant: (for Sheetrock W/R Gypsum Panels) Sheetrock Brand W/R Sealant.

r. Joint Treatment: Perf-A-Tape Reinforcing Tape.

Durabond Joint Compound (Taping, 90, XL).
USG Joint Compound (Taping, Topping, All Purpose).
USG Crater Free Ready-Mixed Joint Compound (Taping, Topping, All Purpose).

s. Caulking: USG Acoustical Sealant.

t. Concrete Finishing Compound: Cover Coat Drywall Compound (as ready-mixed) (with sand additive).

u. Cavity Shaft Wall Materials: USG Shaft Wall Liner, USG Steel J-Runners (style), USG Steel C-H Studs (style), USG Steel E-Studs (style).

v. Cavity-type Area Separation Wall Materials: USG Gypsum Liner Panels, USG Steel J-Runners (style), USG Steel C-H Studs and E-Studs (style).

w. Solid-type Area Separation Wall Materials: USG Gypsum Liner Panels, USG Steel J-Runners (style), USG Steel H-Studs and C-Studs (style).

Part 3: execution

3.1 gypsum panel application

3.1.1 basic single-layer system, treated joints

a. Position all ends and edges of all gypsum panels over nailing members, except when joints are at right angles for framing members as in horizontal application or when end joints are backblocked.

b. Apply Sheetrock Panels first to the ceiling and then to the walls. Extend ceiling board into corners and make firm contact with top plate. To minimize end joints, use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.

c. Attach panels to framing supports by: (Standard Single Nailing Method) (Adhesive—Nail-On Method) (Double Nailing Method) (Power-driven USG Brand Screws). Space fasteners not less than ⅜″ from edges and ends of panels and drive as recommended for specified fastening method. Drive fasteners in field of panels first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.

d. Cut ends, edges, scribe or make cutouts within field of panels in a workmanlike manner.

e. Install trim at all internal and external angles formed by the intersection of either gypsum panel surfaces or other surfaces. Apply corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions:

(**Multi-layer systems:** see pertinent U.S.G. System Folders.)

3.1.2 Sheetrock W/R Gypsum Panels—(see U.S.G. Folder SA-924).

3.1.3 lamination of Sheetrock Gypsum Panels to interior monolithic concrete and unit masonry

a. The masonry or concrete shall be clean, smooth and dry prior to application. If wood base is to be used, attach wood nailer to wall before lamination is started.

b. Cut face panels to allow continuous clearance (⅛″ to ¼″) at floor. Apply Durabond 500 Adhesive at center and near each panel edge in strips consisting of 4 beads, ¼″ wide x ¼″ high and spaced 2″ o.c. Position panels vertically over wall surface, press into place and impact over entire surface 16″ o.c., including edges and ends.

c. Install trim at all intersections of panel surfaces with other surfaces.

d. Lamination to interiors below grade or directly to interior surfaces of exterior walls, and lamination where exposure to moisture is extreme or continuous, are not recommended construction.

3.2 RC-1 Resilient Channel erection

(See specifications in U.S.G. Folder SA-924.)

3.3 steel stud and runner erection

(See specifications in U.S.G. Folder SA-923.)

3.4 metal furring channel erection

(See specifications in U.S.G. Folder SA-923.)

3.5 control joint installation

Attach USG Control Joint No. 093 with Bostitch 9⁄16″ "G" staples or equal spaced not over 6″ apart in each flange. Cut end joints square and align for neat fit. Remove protective tape when joint treatment is completed.

3.6 fastener and adhesive application

3.6.1 USG Brand Screws

Power-drive with an electric screwdriver so screwheads provide a slight depression below surface of gypsum panels without breaking face paper. Do not drive screws closer than ⅜″ from edges and ends of board.

3.6.2 nails

Drive nails with heads slightly below gypsum panel surface in a dimple formed by crowned face of hammer. Drive nails no closer than ⅜″ from edges and ends of panel.

3.6.3 adhesive

Mix and apply in accordance with manufacturer's directions, and as follows:

a. Apply Durabond Joint Compound-Taping or 90 in the prescribed manner to back of face panels to be laminated. Laminate face panels to (base layer panels) (coreboard) using moderate pressure and temporary nailing or shoring to insure adequate bond.

b. Apply Durabond (200) (300) Adhesive in a continuous ⅜″ bead at center of attachment to face of framing members. Where two gypsum panels meet on a framing member, apply two parallel beads on face of framing at panel joints. Do not apply adhesive to members such as bridging, diagonal bracing, etc., into which no supplemental fasteners will be driven. Immediately following contact of panel to adhesive, apply necessary fasteners 16″ o.c. around perimeter of panel, ⅜″ away from edges and ends. On ceilings only, apply one temporary field fastener per framing member at mid-width of board; remove after 24 hours. With predecorated panels prebowed and applied vertically, use permanent fasteners only at top and bottom of panel.

c. Apply Durabond 500 Adhesive in strips to center and along both edges of gypsum face panel. Apply strips with a notched metal spreader having four ¼″ x ¼″ minimum notches spaced max. of 2″ o.c. Position face panels against base panels; fasten at top and bottom (vertical application) as required. For laminated ceilings, space fasteners 16″ o.c. along edges and ends, with one permanent field fastener per framing member installed at mid-width of panel. Press panel into place with firm pressure to insure bond; reimpact within 24 hrs. if necessary.

d. Apply Durabond 600 Adhesive with a short nap paint roller to cover both contact surfaces. Let adhesive air dry to the touch; about 30 minutes depending on temperature and humidity, until color turns from light blue to darker blue. Apply panels as soon as possible after drying occurs. On walls, fasten 16″ o.c. at top and bottom (vertical application) as required. In ceiling lamination, apply permanent supplementary fasteners at each corner of sheet, and along edges spaced max. 48″ o.c. Press panel into place with firm pressure to insure bond.

e. Apply Durabond Multi-Purpose Adhesive in continuous ⅜″ beads to framing. On floors, install plywood panels across joists with 1⁄16″ gap between panels and end joints staggered. Where panel ends butt, apply two beads so each panel is bonded. Within 15 min. after applying adhesive, position panels and nail to supports with 6d annular ring or 8d common nails spaced 12″ o.c. Apply adhesive to long edge of installed panels to bond next row of panels.

On walls, apply a continuous ⅜″ bead to center of studs to within 6″ of board perimeter. At panel joints, apply two adhesive beads—one at a time—as each panel is installed. Do not apply adhesive at inside corners or to top and bottom plates, bridging, bracing and fire stops. Apply no more adhesive than can be covered in 15 min. Set panel in place, fasten 16″ o.c. along top and bottom of panel and impact by hand along each stud.

3.7 pre-fill application

a. Mix Durabond 90 Joint Compound according to directions on bag. Do not overmix, or use extremely cold water or cold joint compound.

b. Pre-fill all "V"-grooves formed by abutting eased edges of Sheetrock SW Gypsum Panels with Durabond 90 Joint Compound using a flexible 5″ or 6″ joint finishing knife or Ames Pre-Fill Tool. Fill "V" joint flush and wipe off excess compound beyond the "V" groove, leaving a clear depression to receive tape. Allow pre-fill to harden prior to the next application (tape or embedding coat).

3.8 joint treatment application

a. Mix joint compound in strict accordance with manufacturer's recommendations.

b. Apply taping or embedding compound in a thin uniform layer to all joints and angles to be reinforced. Immediately apply Perf-A-Tape Reinforcing Tape centered over joint and seated into compound. Sufficient compound—approx. 1/64″ to 1/32″—must remain under the tape to provide proper bond. Follow immediately with a thin skim coat to embed tape, but not to function as a second coat. Fold and embed tape properly in all interior angles to provide a true angle. The tape or embedding coat must be thoroughly dry prior to application of second coat. (Exception: Durabond Joint Compounds need only have hardened prior to application of next coat.)

c. Apply second coat of joint compound over embedding coat, filling panel taper flush with surface; cover tape and feather out slightly beyond first coat. On joints with no taper, cover the tape and feather out at least 4″ on either side of tape. Allow second coat to dry thoroughly prior to application of finish coat. (Exception: Durabond Joint Compounds need only have hardened prior to second coat application.)

d. Spread finish coat evenly over and extend slightly beyond second coat on all joints and feather to a smooth uniform finish. Over tapered edges, do not allow finished joint to protrude beyond plane of the surface. Apply a finish coat to cover tape and taping compound at all taped angles and provide a true angle. Where necessary, sand between coats and following the final application of compound to provide a smooth surface ready for decoration.

3.9 finishing fasteners

Apply a taping or all-purpose type compound to fastener depressions as the first coat. Follow with a minimum of two additional coats of topping or all-purpose compound, leaving all depressions level with the plane of the surface. Use Durabond Joint Compound-Taping and 90 only for the first coat on fasteners.

3.10 finishing beads and trims

a. Apply first coat to all bead and trim and properly feather out from ground to plane of surface. Compound must be thoroughly dry prior to application of second coat. (Exception: Durabond Joint Compounds need only have hardened prior to application of next coat.)

b. Apply second coat in same manner as first coat, extending compound slightly beyond onto face of panel. Compound must be thoroughly dry prior to application of finish coat.

c. Apply finish coat to all bead and trim, extending compound slightly beyond the second coat and properly feathering from ground to plane of surface. Sand finish coat as necessary to provide a flat smooth surface ready for decoration.

3.11 exterior joint system application

a. Mix Durabond XL Joint Compound according to directions on the bag. Do not overmix, nor use in temperatures below 45°F.

b. Pre-fill joints of USG Exterior Gypsum Ceiling Board with Durabond XL Compound. After pre-fill has hardened, embed Perf-A-Tape Reinforcing Tape centered over joint. When compound has hardened, immediately apply fill coat of Durabond XL.

c. Apply Durabond XL Compound over flanges of USG Control Joints, metal beads and trim. Spot fastener heads.

d. After fill coat has hardened, apply finishing coat of Durabond XL Compound. Completely cover all joints, angles, beads, control joints and fasteners.

Note: *After DURABOND XL Compound has dried, apply one coat oil-based primer-sealer and one coat exterior oil or latex paint.*

3.12 Cover Coat Compound application

a. Concrete surfaces shall be clean, smooth, dry and free from contaminants and exposed metal protected with a rust-preventative paint and allowed to dry.

b. Mix Cover Coat Compound according to manufacturer's directions and apply to concrete (ceiling) (columns) before interior partitions are erected. Coordinate application of USG No. 800 Corner Bead on angles and corners as required, embedding and covering both flanges with a smooth fill of Cover Coat Compound 3″ to 4″ wide. Sand surface of each coat after it has dried at least 24 hours. Apply sufficient coats to obtain smooth surface suitable for (texturing) (decoration).

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, DURABOND, FIRECODE, TEXTONE, THERMAFIBER, DUR-A-BEAD, ULTRAWALL, PERF-A-TAPE, COVER COAT, PYROROCK.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

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UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606
SA-927/USG/1-77

SA
928

9.12/Ug

textone
vinyl-faced gypsum panels

product folder

UNITED STATES GYPSUM
1977—5
9 P
GYPSUM DRYWALL
vinyl-surfaced wallboard

PATTERN AND COLOR SELECTION

Groups in ascending cost range

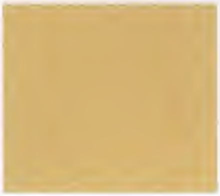
GROUP I

stipples standard

Adobe—26122

New Lime—27752

Bone—26121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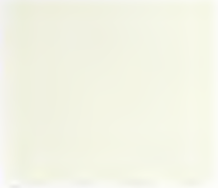
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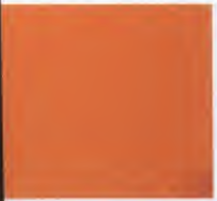
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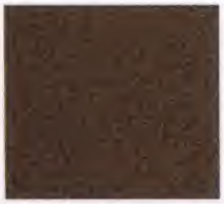
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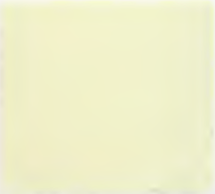
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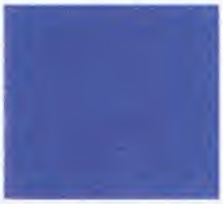
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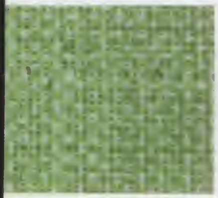
GROUP II

linens standard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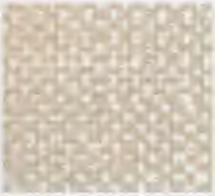
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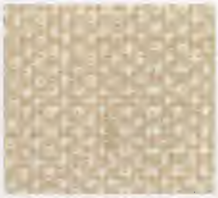
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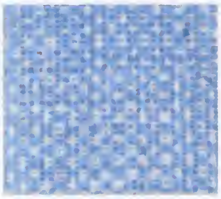
custom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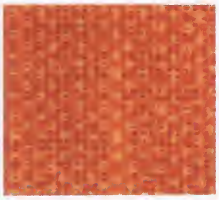
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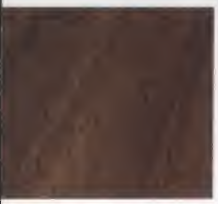
woodgrains standard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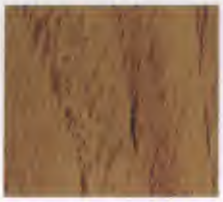
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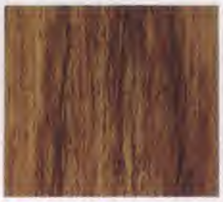
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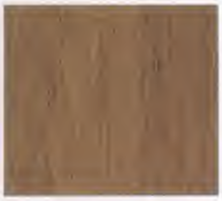
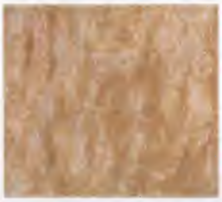

Executive Walnut—08290

granada corks custom

Pearl Gray—08647


Saddle Tan—08646

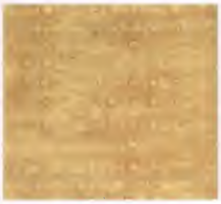
GROUP III

textiles standard

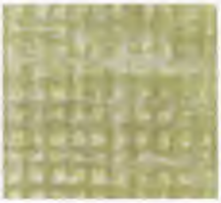
Chalk—51000

Parchment—50700

Mist White—51100


Burnished Gold—45200

custom


Garden Green—50800

Sunburst—50900

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description

Textone Panels are conventional Sheetrock Gypsum Panels with factory-applied decorative vinyl facings. Patterns and colors are now updated to offer greater selection and to strengthen and enhance the "mix-and-match" versatility of the line. Panels are separated into two groups—Standard and Custom—to improve availability of high-demand Standard products and special Custom panels. Thicknesses: stipples, woodgrains, corks—6 mil; linens—8 mil; textiles—about 8 mil on nonwoven fabric-backed vinyl. All panels meet Fed. Spec. SS-L-30D, Type III; the base gypsum panels, ASTM C36.

function and utility

Textone Panels and Mouldings, together with adhesives, fasteners and other conventional drywall components, are used for predecorated demountable partitions, permanent partitions and in remodeling work. The tough vinyl covering is wear-resistant and easily cleaned for lasting beauty. Also available in Firecode Panels for fire-rated construction.

U.S.G. Architectural Technical Literature describes uses of Textone Gypsum Panels in steel- and wood-frame construction (SA-923, SA-924) and USG Demountable Partitions (SA-1030). Vinyl selections may also be made from Textone colors and patterns for Ultrawall Partitions (SA-1020) and Vaughan Walls® Partitions (SA-1040). Also in Sweet's Architectural File, Secs. 9.5 and 10.1.

limitations

1. For adhesive application of Textone Panels, only Durabond Adhesives are recommended. Other adhesives may not be compatible and could result in delamination and discoloration of vinyl surface.

2. When Textone Panels are to be used in place of Sheetrock Panels in a fire-rated assembly, be sure that the applicable fire test permits exposed joints or battens. Also, the type of adhesive usually is limited to Durabond Joint Compound-Taping or 90.

3. Exposure to excessive or continuous moisture and extreme temperature should be avoided.

technical data

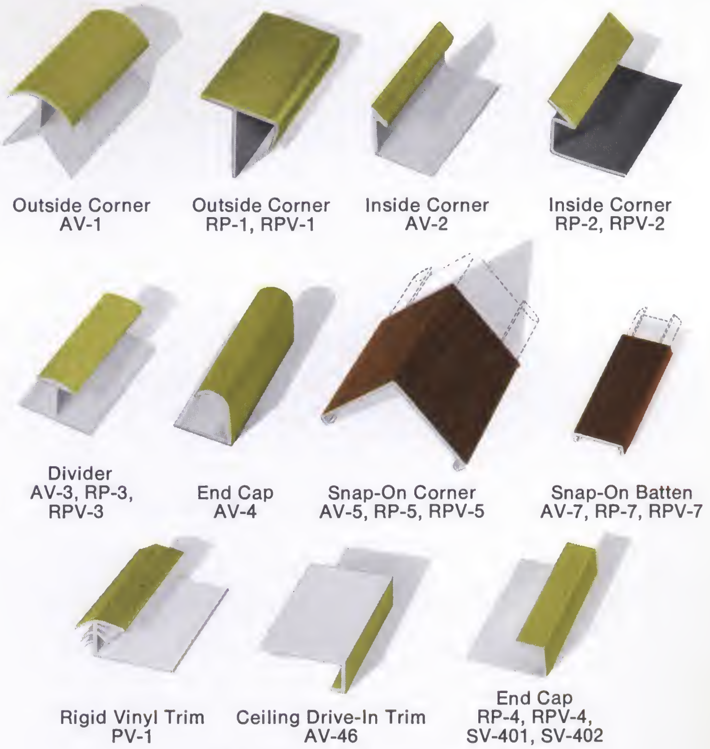
Surface—6- and 8-mil unbacked vinyl film (except nonwoven-fabric backed Textile pattern), deeply embossed for texture or woodgrain effects. In 27 attractive colors and textures, divided into three price groups.

Edge Configuration—classic beveled edge; forms a shallow "V"-groove joint.

Availability—nationwide stocks: ½″ thick, 4′ wide, and 8′, 9′ and 10′ long in Standard patterns of Textone Panels. Other lengths, thicknesses, Custom patterns and Firecode Panels may be subject to minimum quantity and production lead time (Custom requires 4 to 6 weeks for delivery). Small orders for non-standard lengths and thicknesses may incur nominal surcharge. Check local availability.

Textone Vinyl Wallcovering, supported film 54″ wide, with 1.0 oz. per sq. yd. nonwoven-fabric backing, is offered separately in limited quantities to provide a commercial match with Textone Panel colors and textures on adjacent walls and columns. Available in rolls of 30 lin. yds.

Textone Mouldings cover joints and edges, protect corners. Nine shapes, ⅜″, ½″ and ⅝″ sizes in extruded aluminum (AV series), steel (SV series) and vinyl plastic (PV-1 series). Also available to match or contrast with Textone Panels are low-cost, precision-extruded vinyl plastic mouldings in six shapes and two finishes—factory-laminated vinyl (RPV series, RVP-5 and RPV-7 not available in Textile pattern) and solid colors: ivory, tan, chocolate, black (RP series).



Outside Corner
AV-1

Outside Corner
RP-1, RPV-1

Inside Corner
AV-2

Inside Corner
RP-2, RPV-2

Divider
AV-3, RP-3,
RPV-3

End Cap
AV-4

Snap-On Corner
AV-5, RP-5, RPV-5

Snap-On Batten
AV-7, RP-7, RPV-7

Rigid Vinyl Trim
PV-1

Ceiling Drive-In Trim
AV-46

End Cap
RP-4, RPV-4,
SV-401, SV-402

TEXTONE Mouldings

Luxurious TEXTONE Panels provide beautiful and uniquely innovative interiors as demonstrated in this striking choice of Granada Cork Custom pattern in Saddle Tan.

SA 928 TEXTONE gypsum panels

fire hazard classification(1)

TEXTONE panel pattern	flame spread	fuel contributed	smoke developed
stipples, woodgrains, corks	25	5	10
linens	20	10	40
textiles	25	10	25

(1) Tested in accordance with ASTM E84-70 by Southwest Research Institute.

specifications

notes to architect

1. *For fire-rated assemblies, refer to application requirements of the specific system tested. Mechanical fastening is usually required along with a specific type of adhesive.*

2. *For more complete details and application using adhesives, see U.S.G. Folder SA-927 and manufacturer's directions.*

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company. Installation of Textone Vinyl-Faced Panels shall be by workmen experienced in this trade.

1.3 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions

In cold weather the building shall be heated and ventilated during application of gypsum vinyl panels to maintain temperature and ventilation consistent with good working conditions for finish work.

Part 2: products

2.1 gypsum vinyl panels: Textone (type) (pattern and color) (thickness and size) (core formulation).

2.2 mouldings and trim: Textone Mouldings (type) (pattern and color) to match or contrast with Textone Panels.

2.3 adhesives

Durabond (200) (300) (500) (600), Durabond Joint Compound-210 or 90. *Specify from Gypsum Panels and Accessories Folder, SA-927.*

2.4 fasteners

a. Matching Color Nails (color) (length).
Specify: 1⅜" for single layer, 1⅞" for double layer.

b. USG Type S Screws (length).
Specify: 1" for single layer, 1⅝" for double layer.

c. Durabond Vinyl Foam Tape.
Specify: to eliminate mechanical fasteners or temporary bracing and for temporary attachment of adhesively applied panels until adhesive attains maximum bonding strength.

Part 3: execution

3.1 TEXTONE Gypsum Panels—wood or steel studs

Apply 8"-long strip of vinyl foam tape to face of each stud, positioned at midpoint of studs up to 8′ long, at third-points on studs up to 12′ long and quarter-points on studs over 12′. Where no mechanical fasteners are to be used at top or bottom of stud, apply an 8"-long strip of tape. Apply a continuous ⅜" bead of Durabond 200 or 300 Adhesive (300 for wood studs only) to the entire face of studs between vinyl foam tape. Immediately apply Textone Panels vertically and apply sufficient pressure to insure complete contact with both the tape and adhesive.

3.2 TEXTONE Gypsum Panels—base layer of gypsum panels

Apply Durabond 600 Adhesive to back of Textone Panels and face of base layer. Allow adhesive to air-dry until it turns dark blue in color, then bring panels in contact. Impact entire surface to assure complete contact.

3.3 TEXTONE Gypsum Panels—base layer of masonry, gypsum board, wood or mineral fiber board

For masonry and gypsum board, apply continuous strips of vinyl foam tape to entire width of Textone Panel back at midpoint and ⅜" from each end. Spread Durabond 500 Adhesive over entire area of panels between tape using notched metal spreader with ¼" x ¼" notches spaced 2" o.c. Position panel and immediately apply sufficient pressure to assure complete contact over entire surface. (Mechanical fasteners may be substituted for tape at ends of panels.)

For application of Textone Gypsum Panels to wood or mineral board, pre-bow panels and apply Durabond 500 Adhesive over entire back surface. Use mechanical fasteners at top and bottom of panel.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: TEXTONE, SHEETROCK, FIRECODE, DURABOND, ULTRAWALL, USG.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM 101 South Wacker Drive, Chicago, Illinois 60606
BUILDING AMERICA

SA-928/USG/rev. 5-77 Printed in U.S.A.

9.5/Ue

description and utility

The complete and modern product line offered by United States Gypsum in paints and surface treatment is a natural outgrowth of the company's experience. As the world's largest producer of gypsum and other wall and ceiling construction materials, U.S.G. should know best how to *finish* those surfaces.

Today's full range of USG interior, exterior and special coatings reflects decades of research and testing, both in the laboratory and the marketplace. U.S.G. has the broadest job experience in the industry; 45% of all American homes are built or finished with its various products. Finishing products undergo daily analysis and improvement at the same Research Center where structural materials are developed—to meet standards of quality without compromise.

Use of USG Paints brings the important advantage of dealing with a single manufacturer who is responsible for all components of the finished wall or ceiling—gypsum base and veneer plaster or gypsum panels and joint treatment, drywall screws and adhesives, steel studs and accessories, insulation, sheathing, ceiling tile, gypsum roof deck and exterior stucco. All are made by U.S.G. to *work together*, from DURACAL Texture for exterior surfaces, to FIRECODE 20, a remarkable Classified Fire Hazard Coating for interior spray application.

This catalog covers the finishing products recommended for virtually all U.S.G. partition and ceiling assemblies, as well as for exteriors. A complete, quick-reference Selector Guide appears on pages 4 and 5; general specifications start on page 7. Drywall joint treatment products are covered separately in Folder SA-927. USG paint products are available in six special-purpose groups:

Interior Finishes—emulsion line headed by GRAND PRIZE and TAL Latex Wall Paints, both flat and eggshell finish with matching latex semi-gloss enamel. In addition, spirit-thinned finishes including TAL Alkyd Flat Wall Paint, GRAND PRIZE Diamond Lustre and Eggshell Enamels, TAL Alkyd Semi-Gloss Enamel.

Exterior Wood and Masonry Coatings—continuing evaluation at U.S.G. Research shows water-based emulsion, breather-type house paints perform superbly over wood siding and shingles as well as masonry surfaces; performance history now favors latex over solvent-based paints for house exteriors. GRAND PRIZE Latex House Paint (medium gloss) and Latex House and Trim Enamel (high gloss) are U.S.G.'s premium products. Latex primers are available for wood and metal. TAL Vinyl Acrylic Latex House Paint provides low-sheen protection and beauty for primed wood and masonry. Full color range solvent finishes include IMPERIAL Gloss House Paint, DURABOND Low-Lustre Rustic Finish. Masonry coatings are CEMENTICO Masonry Coating, DURABOND Waterproofing Coating R/M, GRAND PRIZE Latex Floor Enamel.

Wood Stains and Varnishes—pigmented DURABOND Interior Latex Stain offers fade-resistant colors to accent the natural beauty of interior wood surfaces. DURABOND Latex Rustic Stains have solid and semitransparent colors for exteriors. Varnish products include DURABOND Polyurethane Clear Finish and Latex Clear Finish.

Texture Finishes—the industry's broadest line, leading the resurgence of surface ornamentation, includes ready-to-use USG Texture I sand-finish and Texture II ripple-finish; IMPERIAL QT Texture Finish for an acoustical appearance on ceilings; powder products for various textures and stipples; USG R/M Smoothcoat and Texture for special effects and DURACAL Texture for spray application to exterior surfaces.

Surface Preparation Products—long-established leadership items are TAL Vinyl Sealer, SHEETROCK Sealer and pigmented GRAND PRIZE Primer-Sealer; line includes latex and alkyd interior primers, enamel undercoat, oil-based exterior primers, penetrating sealer, block filler and spackling compounds.

Special Coatings—rising fast in architectural preference is FIRECODE 20, a classified fire-resistant latex coating. Also excelling in maintenance value are USG Metal Coat Enamel and three companion primers to retard and prevent rust.

general limitations

The most common causes of paint failures on interior surfaces are: (a) Base surface not dry; (b) Surface improperly cleaned and patched; (c) Variable suction in the base; (d) Failure to use proper treatment for different surfaces, conditions, and finishes. It is estimated that 75% of interior paint failures are due to neglected or improper preparation before the paint can was opened.

Satisfactory results with USG paint products, as with all finishes, depend upon good job practices:

1. Surfaces to be painted must be clean, dry, sound; free of grease, oil, wax, other foreign matter; free of flaking, crumbling or chalking conditions; must be properly prepared.

2. Atmospheric and structural temperatures must be 50° to 60° minimum during application, depending upon type of finish; consult directions.

3. Paints of the water-thinned type should not be used over wallpaper having water-soluble colors; must be protected from freezing.

4. New unpainted plaster (except veneer plaster), stucco, poured concrete, patches in masonry surfaces must age 30 to 60 days minimum prior to paint application; consult directions.

Any other limitations are stated in the label directions for each product.

UNITED STATES GYPSUM
1977—1

9 P

PAINTING
interior, exterior, preparations

types and functions

1. Interior Wall and Ceiling Paints

Grand Prize Latex Wall Paint—ready to use in **Flat** or velvet **Eggshell Finish.** Resists alkalinity in plaster, concrete and joint treatment. Exceptional hide, low sheen and extreme washability. The premium latex paint in U.S.G. line, covers most surfaces in one coat. Quick-drying, with excellent leveling qualities. Vinyl-acrylic latex vehicle. 8 ready-mixed colors, matched in two enamels below. Also available in 54 designer-selected deep color accents in eggshell finish.††

Grand Prize Latex Semi-Gloss Enamel—premier medium-gloss enamel, water-thinnable, matching all ready-mixed colors of Grand Prize wall paint. For all interior surfaces where semi-gloss finish is desired. Quick-drying, but good leveling. Superior hide, gives uniform sheen in 40° range; highly washable and stain-resistant. Self-priming on new drywall surfaces. Acrylic copolymer emulsion vehicle.††

Tal Alkyd Semi-Gloss Enamel—spirit-thinned alkyd semi-gloss matching all ready-mixed colors of Grand Prize wall paint. For wood trim and wall surfaces of kitchen, bath, laundry; sealer or undercoater required on new work and porous surfaces. Dries to medium sheen with outstanding washability, excellent color retention. Alkyd oil resin vehicle.††

Texolite Spray Coat—spray-applied latex coating for unpainted gypsum panels and most interior surfaces. Produces smooth heavy film of uniform sheen over hard or porous surfaces. Highly scrubbable; burnish and stain-resistant; fast drying. Available in four types: **Soft Lustre,** a semi-gloss eggshell finish, smooth or may be lightly textured in application; **Matte Finish,** a flat enamel finish with heavier texture; **Flat Finish,** a dull, dead-flat finish; **Diamond Finish,** producing appearance of sand float finish. Acrylic latex vehicle.

Tal Latex Wall Paint—ready-to-use in **Flat** or **Eggshell Finish,** offers good quality with economy, easy-flowing application. Good one-coat hide can usually be achieved; provides a washable film. Vinyl-acrylic latex vehicle, uses water for thinning and cleanup. 14 colors, matched in **Tal Latex Semi-Gloss Enamel.** Eggshell finish in white and off-white only.††

Tal Alkyd Flat Wall Paint—outstanding spirit-thinned finish for interior walls and woodwork. Excellent hide and leveling, readily washable. Self-priming except over patched, porous or unpainted surfaces. Soya alkyd resin vehicle. Available in white and machine tint bases.

Grand Prize Diamond Lustre and Eggshell Enamels—high-gloss and low-lustre finishes of extreme durability to meet the most stringent maintenance demands. Spirit-thinned; provide flexible film with exceptionally high hide. Soya alkyd resin vehicle. White and tint bases available.††

††For flame spread and smoke resistance, request applicable Data Sheet.

USG Exceptionale Color System: more than 1,350 appealing custom colors are available on special order through dealers using Colortrend® *Colorants. This range offered in 11 products—*Grand Prize *Latex Wall Paint, oil-based* Tal *Alkyd Flat Wall Paint and Semi-Gloss Enamel,* Grand Prize *Latex Semi-Gloss Enamel, Diamond Lustre and Eggshell Enamels, oil-based* Imperial *House Paint,* Grand Prize *Latex House Paint,* Grand Prize *Latex House & Trim Enamel,* Tal *Vinyl-Acrylic House Paint and* Firecode 20 *Classified Fire Hazard Coating. Special machine colors also available in* Durabond *Low-Lustre Rustic Finish and* Durabond *Latex Rustic Stain.*

2. Exterior and Masonry Coatings

Imperial House Paint—U.S.G.'s finest oil-based gloss finish, with a balanced oil-based formula for long weather resistance. Heavy-bodied, with superior hiding and controlled chalking qualities. Tough, flexible film resists cracking and checking, offers maximum protection for substrates. Excellent adhesion, mildew and fume resistance. One coat is sufficient on most surfaces when used over Imperial House Primer. Linseed oil vehicle. 3 ready-mixed colors, plus white. Also available, in white only, is **Imperial One-Coat House Paint** for one-coat finish on most repaint work, exceptional durability and hide; used over Imperial House Primer #894 or USG Latex House Primer #684 on new wood.

Durabond Low-Lustre Rustic Finish, a durable, solvent-thinned alkyd exterior flat finish for primed or unprimed wood siding, shakes and shingles. Fast-drying; hides surface defects. May be reduced with mineral spirits for semitransparent stain. Available in white and 5 ready-mixed colors plus 48 with tint base.

Grand Prize One-Coat Latex House Paint—breather-type modified acrylic emulsion with major advantages over other types: quick-drying, non-yellowing, longer-lasting, mildew-resistant, good bond, pleasing medium lustre. Has excellent hide, controlled chalking. Resistant to alkali, does not readily blister, fade, or stain. Suitable for wood siding and shingles, masonry, stucco, weathered asbestos cement. Modified acrylic latex emulsion vehicle. 13 colors and machine tint bases.

Grand Prize Latex House & Trim Enamel—water-thinned, high gloss finish provides long-lasting protection for wood trim and siding. Spreads easily, dries fast. One coat usually covers; gives two-coat beauty. Acrylic and polyester resin vehicle. Provided in 7 ready-mixed colors and machine tint bases.

Tal Vinyl-Acrylic House Paint—an economical non-penetrating latex coating for unglazed masonry, stucco, wood shakes and primed siding. Combines good hiding, weather resistance, true non-fading color, quick drying. Breather-type formulation permits unwanted moisture to escape. Two coats produce best results. 15 colors and machine tint bases.

Duracal Texture—a thick, ready-to-use latex aggregated coating for spray application to old or new wood, metal, concrete surfaces; asbestos siding. Heavy texture hides most surface blemishes. Flexible, mildew and water-resistant when applied as recommended. White and special colors in 100-gal. quantities or more. Meets Fed. Spec. TT-C-0055, Type II.

Grand Prize Latex Floor Enamel—a tough, hard-wearing, semi-gloss finish for interior or exterior floors of properly prepared concrete or wood. Fortified with polyester resin to resist abrasion and water penetration. Fade-resistant, quick-drying, highly washable. White and six dark colors.

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CEMENTICO Masonry Coating—a water-repellent hydraulic cement base paint in powder form, to be mixed with water. For interior and exterior porous masonry surfaces. Excels in hardness, durability and workability at low cost. Two coats recommended; sand may be added for coating to be scrubbed into masonry for a smoother, denser surface. Lime-proof, alkali-resistant; available in white and on East Coast only.

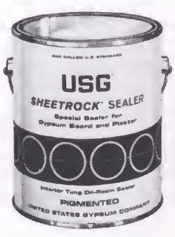
DURABOND Waterproofing Coating—Ready-Mixed—a heavy-bodied coating to decorate and protect porous masonry surfaces against water penetration. Performance backed by 5-year limited warranty. Alkali- and mildew-resistant over unpainted surfaces. Applied in two coats alone or over DURABOND Hydraulic Waterproofing Compound (see Surface Preparation Products). Meets Fed. Spec. TT-P-1411A. White only, tintable to light pastels. **DURABOND Waterproofing Coating,** a sanded powder product, is also available in white only. Special **DURABOND Waterproofing Latex Additive** should be specified with the powder product to improve adhesion, harden surface and minimize dryout problems.

3. Wood Stains and Varnishes

DURABOND Interior Latex Stain—a high-grade water-based product to preserve the natural beauty of new wood paneling, furniture and other interior woodwork. Ready-to-use, provides light or transparent effect, heavier semitransparent stain or still darker color when recoated. Nonspotting and will not raise the grain. Topcoat with DURABOND Latex Clear Finish, DURABOND Polyurethane Gloss or Satin Finish. Water-soluble resin vehicle. Available in 12 fade-resistant earthtone colors.

DURABOND Latex Rustic Stains—richly pigmented, solid or semitransparent stains with exceptional hiding qualities for new work and refinishing of wood siding, shakes, fencing, beams and soffits. Allows wood texture to show through. Alkaline-resistant, may be used on concrete surfaces. Not recommended for abraded plywood. Vinyl acrylic latex vehicle. 6 ready-mixed colors plus 48 with tint base.

DURABOND Polyurethane Clear Finish—an interior-exterior pale varnish to meet the highest durability requirements in fine floors, woodwork, exterior doors, boat decks, etc. Gives clear transparent water-resistant finish, easier handling because it is a one-component system. Special vehicle compound of soya oil modified polyurethane provides good adhesion when recoated. Available in Gloss and Satin finishes.


USG
SHEETROCK SEALER
Special Sealer for Gypsum Board and Plaster
Interior Tung Oil-Resin Sealer
PIGMENTED
UNITED STATES GYPSUM COMPANY

4. Interior Texture Finishes

USG Texture I—a ready-to-use vinyl-acrylic paint embodying a fine aggregate to produce a slight sand-finish effect combined with light texture. One coat covers fine cracks, blemishes. Quick-drying, tintable.

USG Texture II—low-gloss ripple finish in a latex emulsion. Contains no sharp aggregate, can produce fine textures ranging from "orange peel" effect to smooth rounded stipple. Conceals moderate imperfections, normally requires no sealer. Quick-drying, washable, recoatable. Tintable.

One of several finishes possible with versatile USG Texture II for accent walls or contrast of materials.

USG R/M Smoothcoat and Texture—a heavy-bodied, ready-to-use, vinyl acrylic interior finish. Job-thinned with water for desired effect—smooth, roller-texture or specified texture design. Conceals imperfections; dries to hard white surface. May be tinted with GRAND PRIZE Wall Paint or machine colorants.

TEXOLITE Sanded Paste Stipple—a white, water-base sanded finish for interior walls and ceilings. Tinting not recommended; readily coated with most wall paints.

IMPERIAL QT Texture Finish—aggregated powder, produces acoustical finish appearance on ceilings; provides no acoustical correction. Excellent bonding qualities; helps conceal surface defects. Formulated with vermiculite, polystyrene or perlite aggregates for spray application in coarse, medium or fine textures. White only. First coat of TAL Alkyd Flat Wall Paint or Vinyl Sealer recommended. Fire hazard classification: flame spread 10, fuel contributed 10, smoke developed 0 for polystyrene-aggregated formulation applied over SHEETROCK Panels. *Limitation:* not recommended for use where humid conditions exist.

USG Multi-Purpose Texture—an economical, unaggregated, non-asbestos powder product for producing light to medium-light textures on drywall or other interior surfaces. Textured effect obtained by brush, roller or spray application. Helps conceal minor surface defects. Dries to a sparkling white finish which blends with ceiling texture overspray. Usually overpainted on walls, may be left unpainted on ceilings.

USG Spray Texture—a top-performance non-asbestos powder product available aggregated or unaggregated. Fast drying; offers good concealment and superior coverage. Produces light splatter and fog-and-splatter finishes with machine

(continued on page 6)

SELECTOR GUIDE TO USG PAINT PRODUCTS

construction materials	type of finish desired	special surface treatment		finish product description	thinners	method application	hours drying time		one gal. coverage (sq. ft.)
		new work	redecorating				touch	recoat	
INTERIOR WALLS									
Block, Brick, or Concrete	Velvet, Smooth Surface	TAL Super Block Filler	TAL Super Block Filler (opt.)	GRAND PRIZE Flat or Eggshell Wall Paint	NR/w	B1, R1, S1	½	8	450
	Velvet, Natural Texture	GRAND PRIZE Primer-Sealer	None	GRAND PRIZE Flat or Eggshell Wall Paint	NR/w	B1, R1, S1	½	8	450
	Flat, Smooth Surface	TAL Super Block Filler	TAL Super Block Filler (opt.)	TAL Latex Flat or Eggshell Wall Paint	NR/w	R1, S1, B2	½	8	400
	Flat, Natural Texture	GRAND PRIZE Primer-Sealer	None	TAL Latex Flat or Eggshell Wall Paint	NR/w	R1, S1, B2	½	8	400
	Semi-Gloss, Smooth Surface	TAL Super Block Filler	GRAND PRIZE Primer-Sealer	TAL Alkyd Semi-Gloss Enamel	NR/ms	S1, B2, R2	3	24	450-500
	Semi-Gloss, Natural Texture	TAL Enamel Undercoat	TAL Enamel Undercoat	TAL Alkyd Semi-Gloss Enamel	NR/ms	S1, B2, R2	3	24	450-500
	Gloss, Smooth Surface	TAL Super Block Filler	TAL Enamel Undercoat	GRAND PRIZE Diamond Lustre Enamel	NR/ms	S1, B2, R2	3	24	450
	Gloss, Natural Texture	TAL Enamel Undercoat	TAL Enamel Undercoat	GRAND PRIZE Diamond Lustre Enamel	NR/ms	B1, R1, S1	3	24	450
	Cement, Smooth	Pre-wet	Clean, pre-wet	CEMENTICO Coating	W	B1, S2	—	24	16-24/lb.
	Cement, Sanded	Pre-wet	Clean, pre-wet	DURABOND Waterproofing Coating	W	B	—	24	16-25/lb.
Plaster	Velvet	GRAND PRIZE Primer-Sealer	None	GRAND PRIZE Flat or Eggshell Wall Paint	NR/w	B1, R1, S1	½	24	450
	Flat	GRAND PRIZE Primer-Sealer	None	TAL Alkyd Flat	NR/ms	R1, S1, B1	1	24	400
	Semi-Gloss	GRAND PRIZE Primer-Sealer	TAL Enamel Undercoat	TAL Alkyd Semi-Gloss Enamel	NR/ms	S1, B2, R2	3	24	450-500
	Gloss	GRAND PRIZE Primer-Sealer	TAL Enamel Undercoat	GRAND PRIZE Diamond Lustre Enamel	NR/ms	S1, B2, R2	3	24	450
Gypsum Panels	Velvet	TAL Vinyl Sealer or GRAND PRIZE Primer-Sealer	GRAND PRIZE Latex Wall Paint	GRAND PRIZE Flat or Eggshell Wall Paint	NR/w	B1, R1, S1	½	24	450
	Flat	TAL Vinyl Sealer	Prime if needed	TAL Alkyd Flat	NR/ms	R1, S1, B1	3	24	400
	Semi-Gloss	GRAND-PRIZE Latex Semi-Gloss Enamel	Self-priming	GRAND PRIZE Latex Semi-Gloss Enamel	NR/w	S1, B1, R1	½	24	450
	Gloss	GRAND PRIZE Primer-Sealer	TAL Enamel Undercoat	GRAND PRIZE Diamond Lustre Enamel	NR/ms	S1, B1, R2	3	24	450
	Sand Float Texture	None	None	USG Texture I	NR/w	B1, R1	½	24	200
	Orange-peel-to Ripple Texture	None	None	USG Texture II	NR/w	B1, R1, S1	1	24	200
	Heavy Stipple or Period Texture	As required	As required	USG R/M Smoothcoat; then GRAND PRIZE Paint	W	B, R, O	1	12	125-300
	Medium Light to Medium Heavy Texture	Usually none	None	USG R/M Smoothcoat; then GRAND PRIZE Paint (also 2 finishes below)	W	B, R, O	1	12	125-300
	Medium Light to Very Light Text.	Usually none	None	USG Spray Texture	W	B, R, S, O	1	12	27-54/lb.
	Sand Finish	None	None	TEXOLITE Sanded Paste Stipple	W	B, R	1	12	200
	Fire-resistant	None	None	FIRECODE 20 Coating	NR/W	S1, R2	½	8	80-175
Wood	Semi-Gloss	TAL Enamel Undercoat	TAL Enamel Undercoat	TAL Alkyd Semi-Gloss Enamel	NR/ms	S1, B1, R2	3	24	450-500
	Gloss	TAL Enamel Undercoat	TAL Enamel Undercoat	GRAND PRIZE Diamond Lustre Enamel	NR/ms	S1, B1, R1	3	24	450
	Flat	TAL Enamel Undercoat	None—dull gloss	TAL Alkyd Flat	NR/ms	R1, S1, B1	1	24	400
	Clear Finish	2 coats Finish	1 coat Finish	DURABOND Polyurethane or Latex Clear Finish	NR	B only	2	12	500
Metal (Ferrous)	Flat (Water Thinned)	USG Metal Coat Iron Oxide Primer	None, if free of rust	GRAND PRIZE Flat or Eggshell Wall Paint	NR/w	B1, S1, R2	½	8	450
	Gloss (Solvent Thinned)	USG Metal Coat Iron Oxide Primer	None, if free of rust	Metal Coat Enamel	NR/ms	B1, S1, R2	2	24	600
Metal (Bright)	Aluminum or Gloss	USG Metal Coat Zinc Chromate Primer	None, if free of rust	Metal Coat Enamel	NR/ms	B1, S1	2	24	600
Metal (Galvanized)	Gloss	USG Metal Coat Zinc Dust Primer	None, if free of rust	USG Metal Coat Latex Primer-Finish	NR/ms	B1, S1, R2	2	24	600

NOTES: "Drying Time" and "Coverage" estimates are based on average conditions. Touch = furniture can be returned to living areas.
Abbreviations, Method of Application: B = brush, R = roller, S = spray, T = trowel, O = other; 1, 2, 3 = order of preference. Abbreviations, Thinners: NR/w—Not recommended, use water sparingly; NR/ms—Not recommended, use mineral spirits if needed; W—water per directions.

SELECTOR GUIDE TO USG PAINT PRODUCTS

construction materials	type of finish desired	special surface treatment		finish product description	thinners	method application	hours drying time		one gal. coverage (sq. ft.)
		new work	redecorating				touch	recoat	
INTERIOR CEILINGS **Acoustical Tile or Plaster**	Low Sheen	None	None	GRAND PRIZE Latex Semi-Gloss Enamel	NR/w	B1, R1, S2	½	8	400
	Flat (Low Scrub)	None	None	TEXOLITE Std. Paint	NR/w	R1, S1	½	8	350
Gypsum Panels	Flat (Med. Scrub)	None, or GRAND PRIZE Primer-Sealer	None	TAL Super Ceiling White	NR/w	B1, R1, S2	½	8	250
	Flat (High Scrub)	GRAND PRIZE Primer-Sealer	GRAND PRIZE Latex Wall Paint	GRAND PRIZE Latex Ceiling White Paint	NR/w	B1, R1, S1	½	8	450
	Textured	USG Texture I or II	USG Texture I or II	Any of above finishes for gypsum panels	see above	see above	see above	see above	see above
Plaster	Flat	GRAND PRIZE Primer-Sealer	GRAND PRIZE Primer-Sealer	TAL Alkyd Flat	NR/ms	B1, R1, S1	1	24	400
	Flat	GRAND PRIZE Primer-Sealer	None, or GRAND PRIZE Primer-Sealer	Any USG latex paint shown for int. walls	—	—	—	—	—
Plaster, Drywall or Poured Concrete	Rough Texture	TAL Alkyd Flat	TAL Alkyd Flat	IMPERIAL QT Texture Finish	W	S only	24	not rec.	—
Poured Concrete	Light Texture	TAL Alkyd Flat	TAL Alkyd Flat	USG Spray Texture	W	B1, R1, S1	1	12	20/lb.
FLOORS & PATIOS **Firm Poured Concrete, Brick, Asph.**	Medium Sheen	None, if clean, non-dusting; or TAL Penetrating Sealer	None; clean, firm	GRAND PRIZE Latex Floor Enamel	NR/w	B1, R1	1	12	350-400
Wood or Concrete	High Sheen	TAL Penetrating Sealer; or self-prime	None; clean, firm	GRAND PRIZE Latex Floor Enamel	NR/w	B1, R1	1	12	350-400
EXTERIOR SURFACES **New—Block, Brick, Stucco or Poured Concrete**	Low Sheen	2 coats		TAL Vinyl Acrylic Latex House Paint	NR/w	B1, R1, S1	½	8	350
	Medium Lustre	2 coats		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	350
Old, Light Chalk—Block, Brick, Stucco or Poured Concrete	Low Sheen	Clean, dust-free, wire brush off chalk, 2 coats		TAL Vinyl Acrylic Latex House Paint	NR/w	B1, R1, S1	½	8	350
	Medium Lustre	Clean, dust-free, wire brush off chalk, 2 coats		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	350
Old, Heavy Chalk—Brick, Block, Stucco or Poured Concrete	Low Sheen or Medium Lustre	Clean, dust-free, wire brush off chalk, apply TAL Penetrating Sealer & 2-coat finish		TAL Vinyl Acrylic Latex House Paint	NR/w	B1, R1, S1	½	8	350
	Gloss	TAL Penetrating Sealer		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	12	400
Old or New (unpainted) Block, Brick, Stucco or Poured Concrete	Smooth (Cement)	Clean, free of dust, porous—pre-wet, post-wet		CEMENTICO Coating	W	B1, S1	—	24	16-24 (per lb.)
	Sanded (Cement)	Clean, free of dust, porous—pre-wet, post-wet		DURABOND Waterproofing Coating	W	B, T	—	24	16-24
USG Exterior Ceiling Board	Heavy Texture	Clean, dust-free IMPERIAL House Primer #894 White		DURACAL Texture	NR/ms	S only	12	24	35-60
Wood Surfaces	Heavy Texture	Clean, dust-free IMPERIAL House Primer #894 White		DURACAL Texture	NR/ms	S only	12	24	35-60
Metal	Heavy Texture	Clean, dust-free USG Metal Coat Zinc Chromate Primer		DURACAL Texture	NR/ms	S only	12	24	35-60
New—Unpainted Wood	Low Lustre	DURABOND Low-Lustre Rustic Finish		DURABOND Low-Lustre Rustic Finish	NR/ms	B only	2	24	450
	Medium Lustre	Dry, clean, apply one coat IMPERIAL House Primer #894, 1 or 2 coats finish paint		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	400
	Gloss	IMPERIAL House Primer #894 White, or Latex House Primer #684		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	12	400
	Semitransparent Stain	Prime with DURABOND Latex Rustic Stain		DURABOND Polyurethane Finish-Gloss or Latex Clear Finish	NR	B1, R1, S1	2	12	500
	Full Stain	DURABOND Latex Rustic Stain		DURABOND Latex Rustic Stain	NR	B1, R1, S1	2	18	300
Repaint—Wood Medium Chalk	Low Lustre	Wipe off chalk and dirt		DURABOND Low-Lustre Rustic Finish	NR/ms	B1, S1, R1	2	24	400
	Medium Lustre	Dust off dirt and cobwebs, wash off chalk		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	400
	Gloss	Wire brush, wipe off chalk and dirt, prime bare spots		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	12	400
Repaint—Wood Heavy Chalk	Low Lustre	Wire brush, dust and clean		DURABOND Low-Lustre Rustic Finish	NR/ms	B1, S1, R2	2	24	400
	Medium Lustre	Wash with hose and rag, flush with water		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	400
	Gloss	Wire brush, dust, prime with IMPERIAL House Primer #894 White		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, R1, S1	1	12	400
Pre-Primed Wood Siding	Low Lustre	None		DURABOND Low-Lustre Rustic Finish	NR/ms	B1, S1, R1	2	24	400
	Medium Lustre	None		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	400
	Gloss	None		GRAND PRIZE Latex House & Trim Enamel	NR/w	B1, S1, R1	1	12	400
Hardboard Siding	Medium Lustre	IMPERIAL House Primer #894 White		GRAND PRIZE Latex House Paint	NR/w	B1, R1, S1	½	8	400
Asphalt	Low Sheen Medium Lustre	Clean, firm, tight backing		GRAND PRIZE or TAL Vinyl Acrylic Latex House Paint	NR/w	B1, R1, S1	½	8	400
Metal	Gloss	See primers under "Interior Walls"		Metal Coat Enamel	NR/ms	B1, S1, R2	2	24	600

spray and light "orange peel" texture with roller application on most interior wall and ceiling surfaces. Highly effective on sidewalls; blends with ceiling texture overspray. Tinting not recommended; readily overcoated with most wall paints.

USG Drywall Surfacer-Texture XII—a non-asbestos powder product, mixed with water, for fast, low-cost spray application to interior gypsum drywall surfaces. Available aggregated for sand finish and unaggregated for smooth vinyl finish. Combines easy mixing, fast drying, excellent coverage and good concealment. An ideal base for wall paints; may be left unpainted on ceilings.

5. Surface Preparation Products

Grand Prize Primer-Sealer—a pigmented latex product for use under any type of paint or enamel, performs better under water-thinned paints than any other sealer. Locks in lime, equalizes suction, lays paper and fiber nap, provides "tooth." White only, but may be tinted with machine colorants.

Sheetrock Sealer—a tung oil resin emulsion sealer for use over gypsum panels; also unsurpassed in bridging and filling hairline cracks in plaster. May be used under most interior paints and wallpaper. Equalizes porosity over joint reinforcement and face paper. Especially recommended for kitchens and bathrooms. Tintable to shade of finish coat.

Tal Vinyl Sealer—a pigmented, quick-drying primer-sealer for use on interior gypsum panels, plaster, canvas, concrete block. Recommended for use under alkyd paints and enamels, and under Imperial QT Texture Finish to minimize joint flashing. May be tinted.

USG Metal Coat Latex Primer-Finish—for clean interior or exterior metal surfaces. Rust-inhibiting pigments provide corrosion resistance and durability. Use at least two coats for exteriors. White, may be tinted and used as finish coat in exterior application. Acrylic latex vehicle.

Tal Enamel Undercoat—alkyd base mineral spirit undercoat for interior gloss, semi-gloss or flat oil paints. Not a sealer, but provides low-cost good first coat; fills and equalizes surface to be painted. May be tinted.

Tal Penetrating Sealer—a special non-pigmented alkyd resin solution in spirits, designed to condition exterior or interior surfaces which are porous or moderately chalky; forms firm, tight base for repainting with any paint except cement bonding type.

Grand Prize Latex House Primer #684—for exteriors under Grand Prize Latex House & Trim Enamel and House Paint. Quick drying; stain and mildew-resistant; lead-free. White only.

Imperial House Primer #894—oil-base primer to prepare new or chalky wood surfaces for Grand Prize or Imperial One-Coat House Paint. Lead-free, blister-resistant, breather-type coating. White only.

Tal Super Block Filler—conceals voids, fills pores, gives uniform finish over interior, exterior masonry and other rough surfaces. Not a waterproofing material; may be coated with any paint except cement bonding type—Imperial House Paint or Grand Prize One-Coat Latex House Paint recommended for exteriors. May be tinted. Unaggregated.

Durabond Hydraulic Waterproofing Compound—a quick-setting hydraulic powder compound to control water penetration, plug cracks and openings in masonry. Also excellent for anchoring fixture bolts. Natural color, may be overcoated with Durabond Waterproofing Coating colors.

6. Special Coatings

Firecode 20 Classified Fire Hazard Coating—a formulation for interior application in schools, hospitals and commercial buildings where fire resistance and smoke generation are critical. For spray application, primarily on unpainted gypsum walls and panels, but also suitable for plaster or unglazed masonry surfaces. May be roller-applied using two or three coats.

Firecode 20 is a white, high-build, washable flat latex coating; may be tinted with machine colorants. For 90 sq. ft. per gal. coverage, fire hazard classification: flame spread 20 when applied over Sheetrock Gypsum Panels, or flame spread 10 over 1/4" asbestos-cement board; fuel contributed 0, smoke developed 0. For 175 sq. ft. per gal. coverage, fire hazard classification: flame spread 20 over Sheetrock Panels or 15 over asbestos board; fuel contributed 5 over gypsum panels or 0 over asbestos board, smoke developed 0.

At 2x magnification, FIRECODE 20 test sample is nearly new after 800 scrub cycles.

USG Metal Coat Enamel—a durable gloss finish, highly weather resistant, for interior and exterior metal surfaces. Spirit-thinned; soya alkyd resin vehicle. Comes in 11 safety colors ideal for equipment identification in plants. Used over any of three rust-retardant special primers: **Zinc Chromate,** for bright metals; **Iron Oxide,** for ferrous metals; **Zinc Dust,** for zinc and galvanized surfaces.

Industrial Finishes—Shop coats, primers and other special coatings marketed by U.S.G. Paint Division.

general painting specifications

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications

All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be applied in accordance with its current printed directions.

1.3 submittals

Upon request, the contractor shall provide samples prepared in advance with the specified materials, which, when approved shall be the standards of finish to be provided on this project.

1.4 delivery and storage of materials

a. All materials shall be delivered in their original containers bearing the manufacturer's name, brand name and directions for use.

b. All containers shall be kept tightly closed when in storage, stored at moderate temperatures and protected from damage by tampering and exposure to the elements.

1.5 environmental conditions

a. During cold weather, thermostatically controlled heat shall be provided to maintain (50°) (55°) (60°)F. temperature during and after application until building is occupied. Unvented gas or oil heaters shall not be used to provide heat. Adequate ventilation shall be provided at all times for proper drying.

b. For exterior painting, atmospheric and surface temperatures shall be above 50°F. Paint shall not be applied in damp, foggy or rainy weather.

Part 2: products

2.1 materials

(Specify surface treatment and finish materials from product descriptions and Selector Guide in this catalog. For Federal Specification paints, Industrial Finishes and other paints, ask your U.S.G. representative for recommendations, color samples, etc.)

2.2 colors

Colors of paints shall (match control samples) (match color chips specified) (be as scheduled).

2.3 tinting and mixing

Paints shall be tinted and mixed to specified colors using Colortrend Colorants and delivered ready-mixed to job site.

Part 3: execution

3.1 surface preparation

a. Before painting, prepare surfaces as required in product directions. The base surface must be sound, firm and dry, clean and free of dust, dirt, grease or other foreign material.

b. Interior plaster surfaces—on *old plastered walls*, fill all hairline cracks with Durabond Spackling Putty. Fill larger cracks with Durabond Patching Plaster. Sand rough edges and allow time for spackled and filled areas to dry. Dull the glossy areas by rubbing lightly with fine steel wool or washing with a strong washing powder solution followed by a thorough rinse with clean water. Allow to dry before proceeding. Touch up the spackled and patched cracks and areas with Sheetrock Sealer. Allow to dry. Follow with a brushed-on coat of Sheetrock Sealer over all areas. On *newly plastered surfaces*, treat cracks and gouges in the same manner as for old walls. Apply a coat of Grand Prize Primer-Sealer. When reinforcement of white coat is needed, use Tal Penetrating Sealer.

c. Imperial veneer plaster surfaces—proper sealing of surface is essential. Surface must be sound and dry as outlined above; repair minor imperfections with Durabond Paste Spackling Compound or USG Ready-Mixed Joint Compound-All Purpose. When dry, apply one or more coats of Grand Prize Primer-Sealer or (if surface is weak, friable or chalky) apply Tal Penetrating Sealer. Tint the primer-sealer coat to aid in detection and repair of surface defects; seal any patches or fills revealed after first primer-sealer application. Either water-thinned or solvent-thinned flats or enamels may be used for finish coats.

d. Interior gypsum panel surfaces—prepare joints and fastener heads with (USG) (Durabond) Joint Compound (see Specifications in U.S.G. Folder SA-927).

e. Interior wood surfaces (except floors)—in new wood not previously painted, sand smooth and touch up knots, sap streaks and pitch spots with shellac.

f. Interior metal surfaces—remove grease, oil and plaster spatterings, rust and mill scale.

3.2 application

a. Apply finishes according to product directions. Finishes must be evenly spread and free from runs, sags and other blemishes. Allow all coats to dry before applying following coats. On enamel and varnish finishes, sand lightly and remove dust between coats.

Note to architect: *Where more detailed specification is desired, select from specialty applications shown below.*

b. Sheetrock W/R Gypsum Panels—Seal Sheetrock W/R Panels with Sheetrock Sealer or Tal Enamel Undercoat as prime coat. Apply finish coat of Tal Alkyd Semi-Gloss Enamel, Grand Prize Diamond Lustre or Eggshell Enamel.

c. Predecorated Gypsum Panels—for additional surface protection of predecorated Textone Gypsum Panels, apply (one) (two) coat(s) of Durabond Polyurethane Clear Finish (Gloss) (Satin).

d. Imperial QT Texture Finish

1. All surfaces, including joint compound applications, spackling or patching treatments, shall be dry, clean and sound. Remove any water-soluble materials from surface. Dull or roughen any glossy surfaces. Prime all metal surfaces with a rust-inhibitive oil primer. Fill and seal any exposed wood surfaces.

2. Allow new concrete ceilings and any new concrete patches or repairs to age at least 60 days before applying Imperial QT Finish. Remove form oils, efflorescence, grease and other deposits from all concrete surfaces. Finish any patched or repaired areas to provide a uniform texture and surface.

Grind down any ridges or other protrusions resulting from forms or other causes to the same level as adjacent surfaces; remove all grinding sludge or dust. If filling is required, apply Durabond Joint Compound System (always overcoat with USG Ready-Mixed Joint Compound-All Purpose), Cover Coat Compound, Tal Super Block Filler or USG R/M Smoothcoat and Texture. Apply in as many coats as are needed to provide a level crack-free fill without edge joinings that show through decoration.

3. Exercise special care to provide a smooth level surface, free of irregularities, in areas which will be exposed to sharply angled lighting.

4. In drywall construction, treat joints and fastener heads with a joint system manufactured by the United States Gypsum Company, following manufacturer's instructions. Smooth and spackle any scratches or scuffs in drywall surfaces.

5. When all surfaces are prepared and dry, apply a full coat of Tal Alkyd Flat Paint or Vinyl Sealer. Allow to dry.

6. Mix Imperial QT Texture Finish with water only as directed by manufacturer. Use spray equipment of a size and type to assure acceptable results. Apply by spray only at a coverage rate not to exceed 8 sq. ft. per lb. and in accordance with directions printed on container. Apply material to blend uniformly and cover fully without starved spots or other evidence of thin application. Provide uniform texture without application patterns. Remove any texture droppings or overspray from walls, windows and floor, leaving room clean for following trades.

e. Firecode 20 Classified Fire Hazard Coating

Note to architect: Application of Firecode 20 at a rate of 80-100 sq. ft. per gal. provides a wet thickness of 16-20 mils. Application at 170-180 sq. ft. per gal. rate provides a wet thickness of 8-10 mils. Airless spray is normal method of application; sufficient thickness may also be obtained in two or three coats using roller application. Firecode 20 Coating is supplied white but may be tinted with any Colortrend Colorant in the pastel or "P" range. Normally used as provided in the can. Thin, if desired, with small amount of water.

f. USG Exterior Gypsum Ceiling Board—before painting, finish panel joints, beads, trim, control joints and fastener heads with Durabond XL Joint Compound and allow to dry (see Specifications, U.S.G. Folder SA-927). Apply one coat of Imperial House

Primer #894 and allow to dry. Finish with one coat of either Imperial House Paint or Grand Prize Latex House Paint, or spray-apply Duracal Exterior Texture.

g. Metal Surfaces

1. Flow on USG Metal Coat (Iron Oxide) (Zinc Chromate) (Zinc Dust) Primer in full uniform coat. Provide ample circulating ventilation during and after application.

2. Apply USG Metal Coat Enamel by (brush) (roller) (spray).

h. Acoustical Tile, Panels and Plasters—paint acoustical ceilings only after surfaces have been properly vacuum cleaned. Spray-apply Texolite Vinyl Wall Paint or Grand Prize Latex Semi-Gloss Enamel in white or light tint as specified. Thin with water prior to spraying. Use standard spray atomizing equipment with sufficient fluid and pressure for light uniform coverage. Avoid piling up paint at laps, joinings, or elsewhere. Dust paint in alternating fashion from both sides of raised texture.

i. Radiant Heat Ceilings—after sealer coat of Grand Prize Primer-Sealer has dried, apply (   ) finish coats of Grand Prize Latex Wall Paint. With installations employing Red Top Radiant Heat Plaster, de-energize heating cable for at least 6 hours prior to painting and until paint is dry.

j. Poured Gypsum Roof Decks—in finishing the underside of USG formboards supporting poured gypsum roof decks, a breathing type paint film and fortification against mildew are required. On all formboard types except mineral fiber and asbestos-cement, apply Tal Latex Wall Paint, reinforced by job-site addition of fungicide. On mineral fiber types, apply 1 or 2 coats Tal Alkyd Flat Wall Paint with fungicide. On asbestos-cement formboard, apply Grand Prize One-Coat Latex House Paint; additional inhibitors not required.

k. Precast Gypsum Roof Decks—before painting, USG Metal Edge Gypsum Plank must be dry and galvanized edging must be free of grease or oil. Paint edging with USG Metal Coat Zinc Chromate Primer; seal gypsum surfaces with Sheetrock Sealer. Allow metal primer and sealer to dry. Apply 1 or 2 coats Grand Prize Latex Wall Paint or Tal Alkyd Flat Wall Paint.

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NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information. U.S.G. SALES OFFICES, PAINT DIVISION: **ILLINOIS:** Chicago, 321-5714 • **NEW YORK:** New York City, 247-6091 • **TENNESSEE:** Nashville, 292-6653 **TEXAS:** Dallas, 357-6469.

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SA-933/USG/1-77

SA
1020

ULTRAWALL Partition Systems

## First choice for exceptional beauty ...high performance ...fast assembly

system folder

10.1/Uni

UNITED STATES GYPSUM
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10 P

DEMOUNTABLE PARTITION
drywall—metal stud

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ULTRAWALL–

the easy-come, easy-go partition system—
easy to install, easy to move . . .
with the handsome look of permanence

Ultrawall Movable Partition Systems give new dimensions of function, utility and versatility impossible with fixed partitions. Ultrawall Systems offer independent erection on each side and individually removable panels for total cavity access. They cope beautifully but economically with the needs of commercial, industrial and institutional clients beset with frequent space alterations.

Easy-to-build, easy-to-move, non-load bearing walls with high fire and sound ratings are provided from only four basic components: noncombustible gypsum panels ¾-in. thick, 24 and 30-in. wide set in steel runners and framed with three alternate steel stud systems (see page 5 for details). No exposed studs, battens or fasteners interrupt the smooth, clean-lined effect.

Ultrawall Partitions in bank rail, cornice or ceiling height are available with prefinished vinyl panels in 27 standard and custom colors and five patterns as well as in ready-to-decorate plain gypsum panels.

Skilled installation is provided by experienced U.S.G. licensed contractors, and nationwide distribution assures prompt delivery of all components. The result is earlier completion, quicker occupancy.

Engineered for Quick Change—Ultrawall is one of the fastest-installing partitions; also relocated with maximum time savings.

The secret of speedy assembly is in the simplicity of component design and the ease of construction. Components are quickly moved for rearrangement of space or utilities, yet offer the appearance, rigidity, and other advantages of permanent partitions.

Esthetic Versatility—More freedom of design with more functional capability makes Ultrawall adaptable to virtually any building plan or to the client's changing requirements—without waste of material. Bank rail, cornice and ceiling systems use the same basic components that differ only in type and placement of studs. Systems work interchangeably—fit all standard ceiling grid modules, permit ceiling heights to 12 ft., unglazed railing height to 48 in., and afford ample chase space of 1⅞-in. for concealed wiring, standard-sized electric boxes and sound control blankets. Ultrawall Partitions can allow erection on both sides or one side only to suit future tenant needs. With H/R-studs, individual panels are removable for ready accessibility where needed. Beveled-edge panels are integrally kerfed to engage and conceal the studs.

Total flexibility extends to a choice of decorative panel surfaces, easily attached accessories for corners and windows, and color-anodized aluminum trim finish in new Ultrabronze.

A unique door frame is completely reversible (right or left hand) even after initial installation. Hinge and strike locations adjust to premortised doors for quick, flexible attachment, plus two- or three-piece aluminum frames in a choice of two styles (see Specifications, page 12). Glazing components permit the use of glass anywhere.

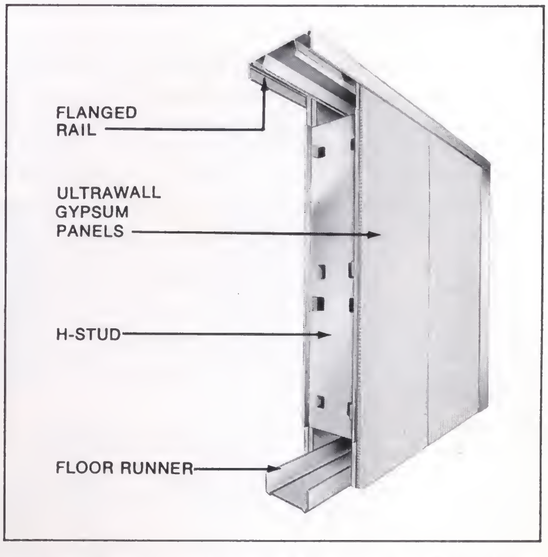
Contemporary Styling—Ultrawall is engineered better for better design esthetics. Structural attachments are concealed, battens eliminated, and panels are mounted flush to present a smooth-faced, permanent partition appearance. The elegant colors and deep-dimensional appearance of vinyl finish add distinction and beauty . . . give complete freedom to control the tone and atmosphere of building interiors.

Woodgrained vinyl facings can be used to lend dignity, quality and prestige . . . or dramatic colors and deep-textured patterns can be selected to project an image of richness and importance . . . crisp, bright pastels are available to impart a modern clean-lined look. The appearance of spaciousness is achieved with easily installed glazing elements and aluminum trim.

Important Economies—Ultrawall lowers in-place assembly, re-erection, replacement and maintenance costs. Actual job studies have shown labor costs to be considerably below those for fixed partitions. Ultrawall frequently out-prices most other movable partitions. That's because its multi-purpose components and prefinished panels are engineered to work together to cut time and labor on the job.

Relocation costs are a fraction of the expense of changing a fixed partition, and often less than most other removable partitions. Components are salvageable and reusable. There's virtually no waste, no debris to clean up. Maintenance is minimal: vinyl-surfaced panels require little cleaning, no repainting. Trim for glazing and door frames is extruded, anodized aluminum for other maintenance advantages.

◂ Contemporary, permanent appearance coupled with versatility in partition heights, trim color, door styles and glazing, shown in settings at left, make ULTRAWALL Partitions a popular choice for office buildings.



Four basic components provide simplicity in design, layout, estimating, erection, moving, reassembly and replacement.

ULTRAWALL Partition construction covered by U.S. Patent No. 3,027,605, other patents pending.

Fast, sequential assembly characterizes the speedy ULTRAWALL system, ideal choice for both remodeling and new construction work.

Doors are reversible with SMR Delta Door Frames, for trouble-free partition changes. No need to stock both left- and right-hand door frames.

High Fire and Sound Ratings—Code approvals have been readily attained with ULTRAWALL Systems—all components are noncombustible. The 24-in. panel assembly with sound attenuation blankets offers a 2-hour fire rating. Both 24-in. and 30-in. panels in floor-to-ceiling height assembly carry a 1-hour fire rating without *extra* material (see test data at right). Most other movable partitions require special studs or added fire protection in the cavity to meet code approvals.

ULTRAWALL Partitions also provide maximum privacy and exceptional sound control. With THERMAFIBER Sound Attenuation Blankets in the wall cavity, ULTRAWALL offers a 48 STC rating—42 STC without attenuation blankets. No other movable partition system provides such ratings without the addition of other materials. Where higher sound requirements are called for, an ULTRAWALL Partition with double panels offers a 50 STC rating.

limitations

1. Non-load bearing.

2. Not recommended where exposed to excessive moisture.

3. Limiting unrestrained length between supports of Cornice Height Partitions, including those with door openings joined by continuous top rail, must not exceed 15 ft. Solid core doors must not be used in Cornice Height Partitions over 10 ft. long.

4. Limiting unrestrained length between supports of Bank Rail Partitions having continuous top rail must not exceed 15 ft. Longer runs require rail struts or intersecting partitions at 15 ft. intervals. Rail struts also required at terminals, swinging gates and max. 10-ft. intervals on free-standing partitions. When bank rail is installed over lightweight concrete floors, L- or T-intersections are recommended at free-standing terminals and at 15 ft. intervals.

5. Limiting heights for Ceiling Height Partition:

	Stud Spacing	H-Studs	T-Studs	H/R-Studs
Max. Code Limits (1)	24″ o.c.	13′ 6″	12′ 6″	11′ 9″
	30″ o.c.	12′ 6″	11′ 6″	11′ 0″
Recommended Limits (2)	24″ o.c.	10′ 9″	10′ 9″	9′ 6″
	30″ o.c.	10′ 3″	9′ 6″	9′ 0″

(1) Heights based on L/120 allowable deflection and 5-psf uniform load. (2) Recommended heights for most acceptable rigidity. Limits based on L/240 deflection, 5-psf uniform load and human response to flexing.

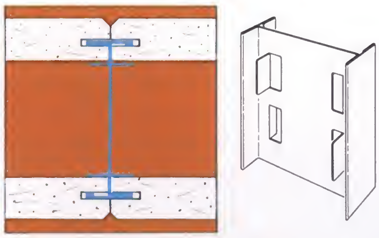
fire and sound ratings

assembly description	test no.	fire rating	STC rating
Movable ULTRAWALL Partition—concealed H-studs 24″ o.c.—steel runners—¾″x24″ bevel edge ULTRAWALL gypsum panels—perimeter gaskets—joints unfinished wt 7 width 3⅝″	U of C(2) 8/18/67 BBN-701008(1)	1 hr.	42
Same construction as above except with ¾″x30″ ULTRAWALL gypsum panels	U of C(2) 7/23/69	1 hr.	
Same construction as above except with ¾″x30″ ULTRAWALL gypsum panels and aluminum ceiling runner	WJE(3) 12/29/70	1 hr.	
Movable ULTRAWALL Partition—concealed H-studs 24″ o.c.—1″ THERMAFIBER sound attenuation blankets—¾″x24″ bevel edge ULTRAWALL gypsum panels—perimeter gaskets—joints unfinished wt 7 width 3⅝″	BBN-701216(1)		47
Movable ULTRAWALL Partition—concealed H-studs 24″ o.c.—1½″ THERMAFIBER sound attenuation blankets—¾″x24″ bevel edge ULTRAWALL gypsum panels one side—double layer opposite side with ¾″ Z-splines between layers—joints unfinished—perimeter caulked—painted wt 12 width 4½″	UL Des U416(5) TL-70-198(4)	2 hrs.	50
Movable ULTRAWALL Partition—concealed T-studs both sides 24″ o.c.—¾″x24″ bevel edge ULTRAWALL gypsum panels—joints staggered and unfinished—perimeter caulked wt 8 width 3⅝″	TL-70-252(4)		40
Same construction as above with 1½″ THERMAFIBER sound attenuation blankets wt 8 width 3⅝″	TL-70-251(4)		48
Movable ULTRAWALL Partition—concealed H/R-studs both sides 24″ o.c.—¾″x24″ bevel edge ULTRAWALL gypsum panels—joints unfinished—perimeter gaskets wt 7 width 3⅜″	USG-750206(6)		40
Same construction as above with 1½″ THERMAFIBER sound attenuation blankets wt 7 width 3⅜″	USG-740909(6)		46

(1) Bolt, Beranek & Newman (2) University of California (3) Wiss, Janney, Elstner & Associates (4) Riverbank Acoustical Laboratories (5) Underwriters Laboratories Inc. (6) United States Gypsum Acoustical Research Facility.

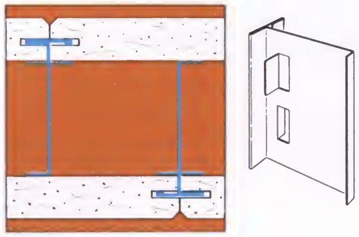
Three interchangeable, fast-installing systems—each with special advantages

Each Ultrawall assembly offers major advantages in simplicity, low cost and design features—provides maximum versatility with economy and ease of installation. Systems can be interchanged in the same installation, as described below, to provide accessible panels only where needed. The only variable is the stud.



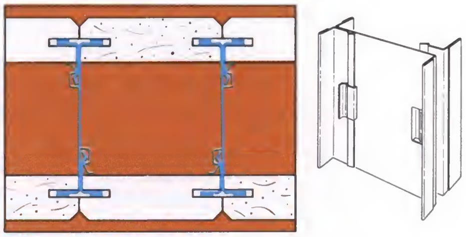
Standard H-Stud System

One of the fastest, simplest movable partitions—outstanding for low cost. The system is assembled, dismantled and reassembled quickly. And because accessibility usually is not required for most buildings (electricians and other trades quickly make changes without removing panels), this ULTRAWALL system is virtually without equal. For quickest installation and lowest in-place cost of the three ULTRAWALL assemblies, specify the standard H-stud system.



T-Stud System

Allows erection of one side of the partition only, if desired. This permits completing the partition after adjoining space is leased, allowing the tenant to select his own surface covering. Additionally, when considerable electrical work is to be installed, it is simpler to leave the partition semi-finished, allowing other trades to complete their work before the second side is enclosed. T-studs may be interchanged with H/R or H-studs. An outstanding choice for tenant or service walls.



H/R-Stud System

Provides access with full security. Opposite panels cannot be removed, yet alternate panels are easily removable and replaceable, providing future access to each cavity. H/R-studs snap in place, the same speedy installation as H-studs. They can be used for a single panel, a series or an entire installation. All other components remain the same; only the stud is changed.

. . . and five groups of colorful, durable, vinyl-faced panels

Ultrawall Gypsum Panels are available in a selection of five factory-applied vinyl facings—stipples, linens, woodgrains, corks and textiles. Panels are classified in two color groups—Standard and Custom—for further choice of availability.

Vinyl thickness for woodgrains, corks and stipples is 6 mil; linens, 8 mil; textiles, 15 oz. per lin. yd. All vinyl-faced panels meet Fed. Spec. SS-L-30D, Type III; the gypsum base panel, ASTM C36.

GROUP I—Stipples

Standard

New Lime

Adobe
Bone
Marigold
Shell

Custom

Orange Lake

Espresso
Yellow Essence
Sapphire

GROUP II—Linens

Standard

Straw

Hemp Green
Pewter
Forsythia

Custom

Tahitian Blue

Autumn Rust

Woodgrains & Corks

Standard, Woodgrains

Distressed Pecan

Imperial Walnut
Teak
Executive Walnut

Custom, Granada Corks

Saddle Tan

Pearl Gray

GROUP III—Textiles

Standard

Parchment

Chalk
Mist White
Burnished Gold

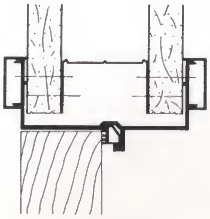
Custom

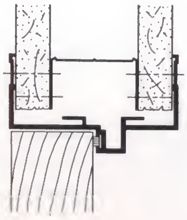
Sunburst

Garden Green

details

door frames


⑨ Delta frame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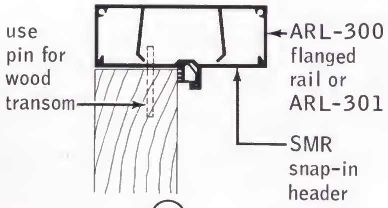

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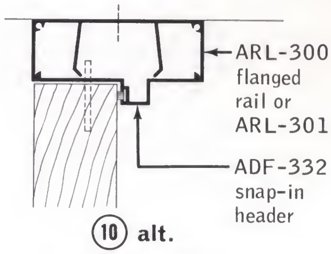

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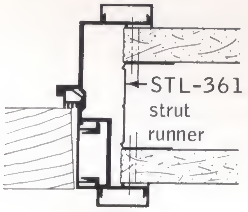

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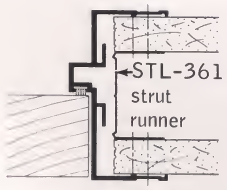

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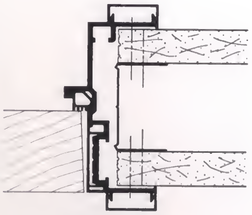
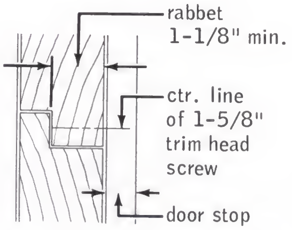
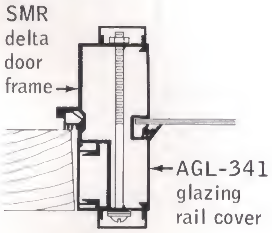

⑪ alt. Gamma frame



⑫

glazing



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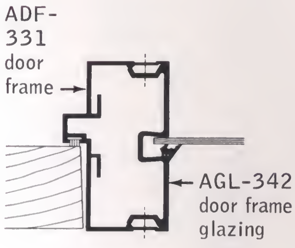

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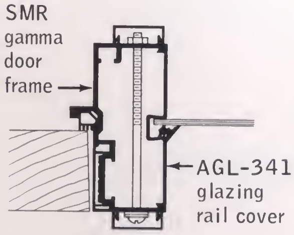

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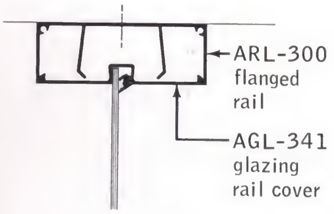

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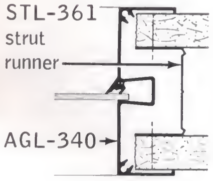

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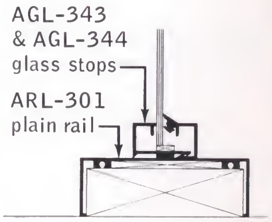

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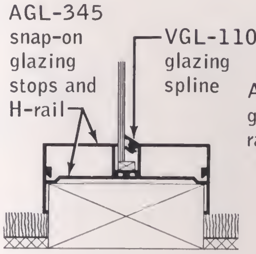

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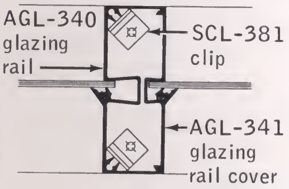

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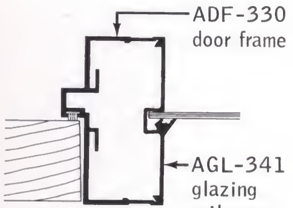

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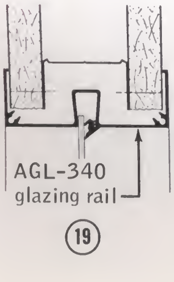

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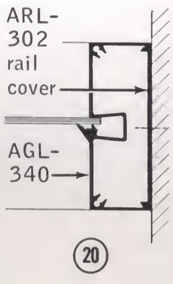

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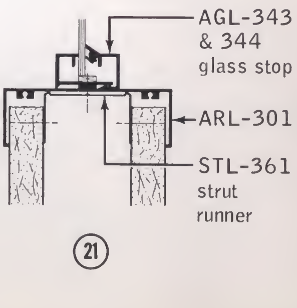

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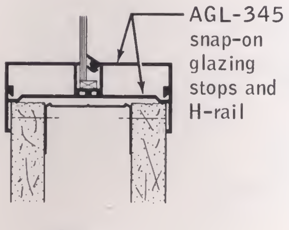

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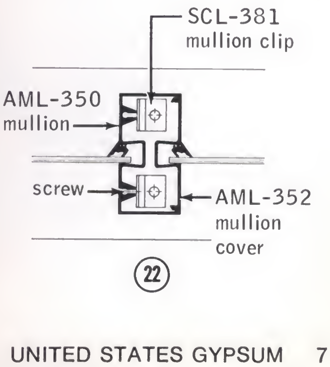

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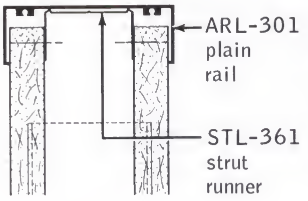
details

scale: 3" = 1'-0"

cornice height



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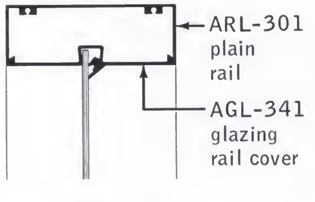

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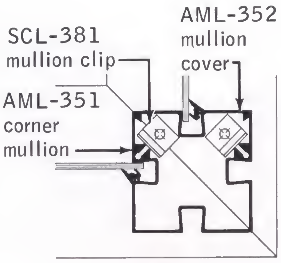

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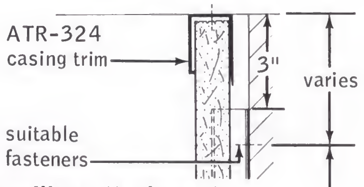
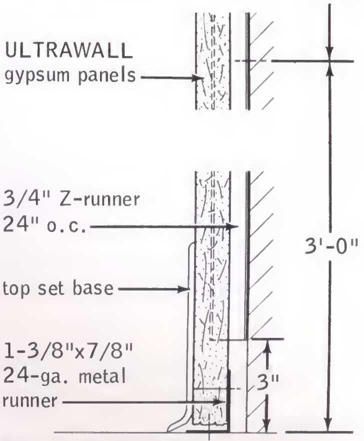
wall furring

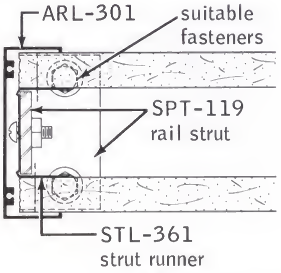


ceiling attachment



floor attachment

rail height



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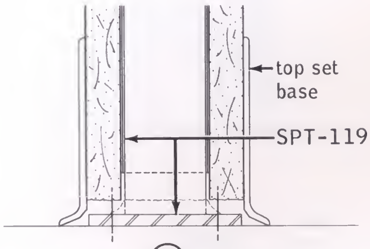

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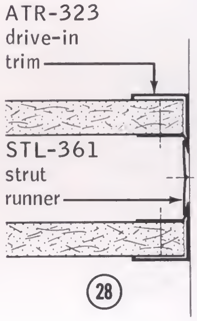

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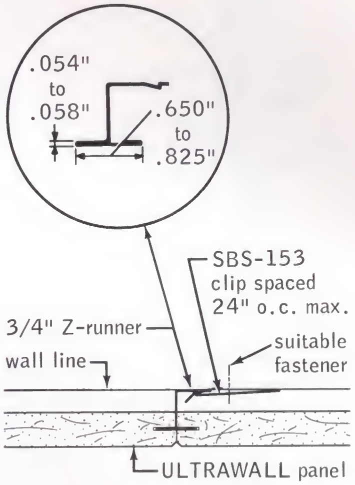
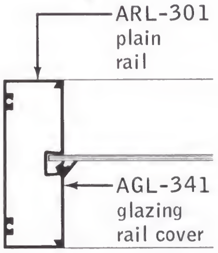


wall furring
cross section



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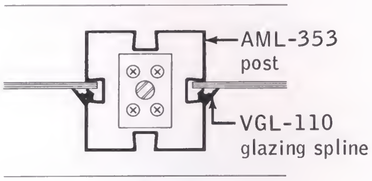

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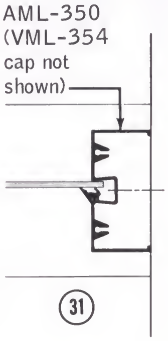

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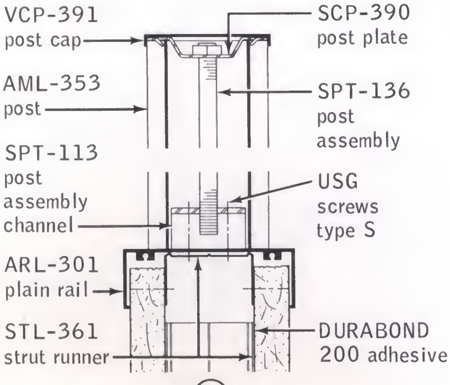

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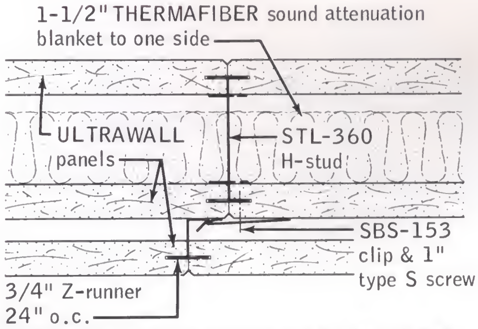
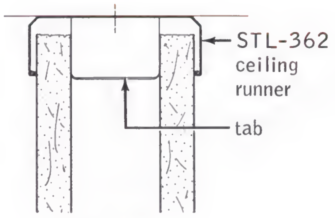


H-stud system sound wall—TL-70-198

details—steel/vinyl trim



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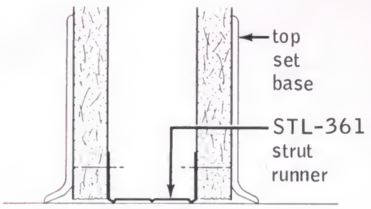

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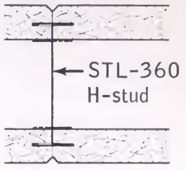

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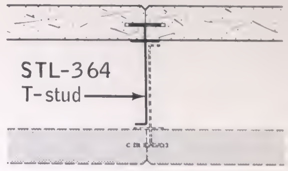

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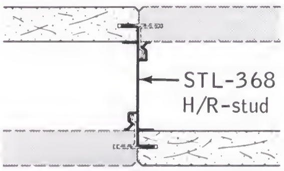

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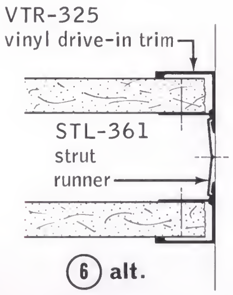

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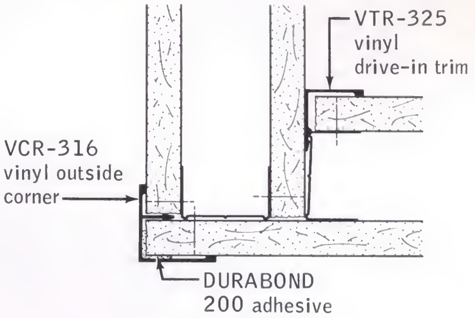

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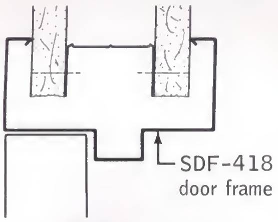

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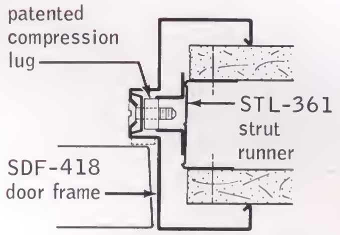

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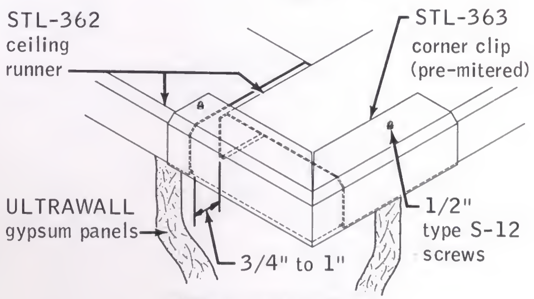


ceiling runner corner

fixture attachment data

fastener loads

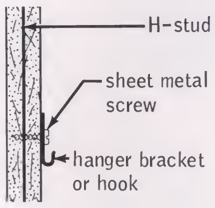
fastener type and attachment	allow. withdrawal resistance	allow. shear resistance
Type S screw into H, T or H/R-stud(1)	100 lb.	100 lb.
#8 s.m. screw into H, T or H/R-stud(1)	80 lb.	100 lb.
¼" molly bolt into panel only(2)	40 lb.	80 lb.
¼" toggle bolt into panel only(2)	40 lb.	60 lb.

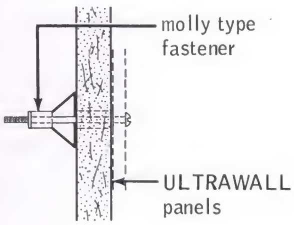
partition load capacity

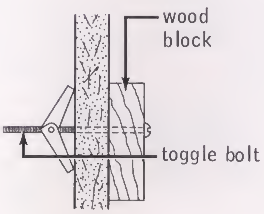
attachment system	max. load one side	max. load both sides
Type S screw into H or H/R-stud(1)	350 lb. per stud	500 lb. per stud
Type S screw into T-stud	350 lb. per stud	350 lb. per stud
¼" molly or toggle bolt into panel with H-studs(3)	250 lb. per panel	250 lb. per panel
¼" molly or toggle bolt into panel with H/R-studs(3)	125 lb. per panel	125 lb. per panel

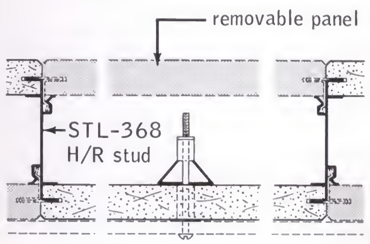
(1) Screws driven into fixed member or H/R-stud. (2) Not recommended for access panels with H/R-studs. (3) Attachment located at vertical centerline of panel.

fixture attachments—light

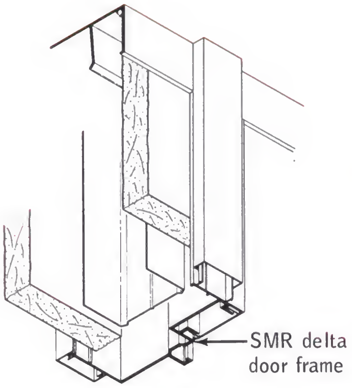








details—H-stud system



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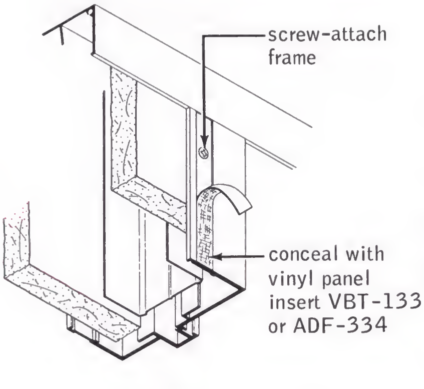

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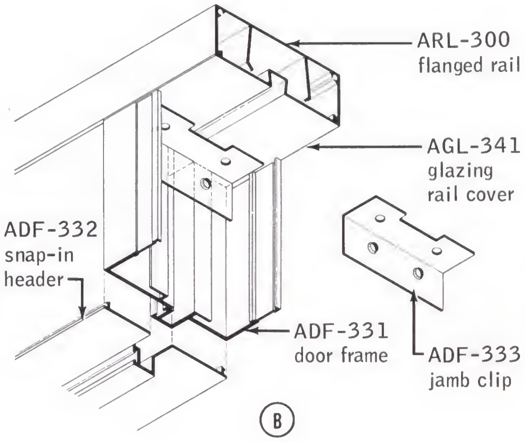
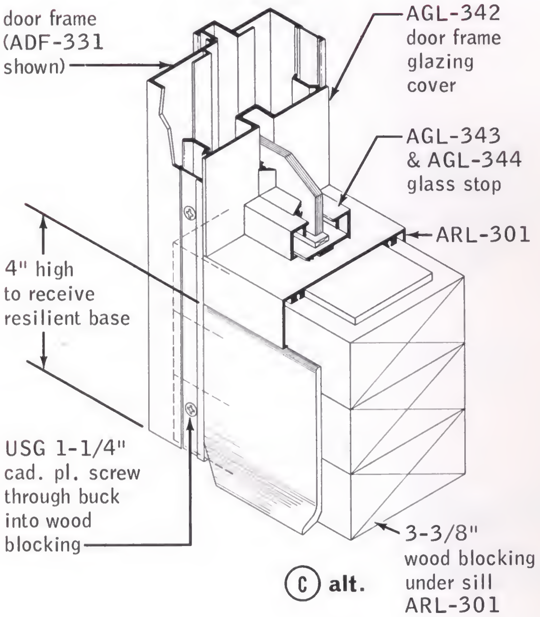


B



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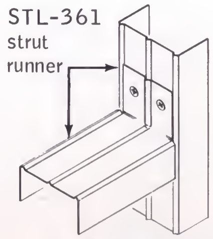
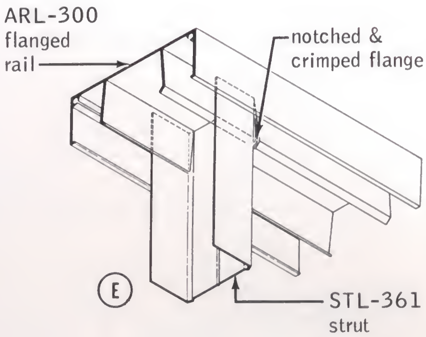


STL-361 strut runner framing at door or window head see details 10 & 20



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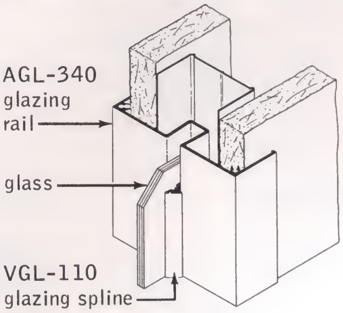

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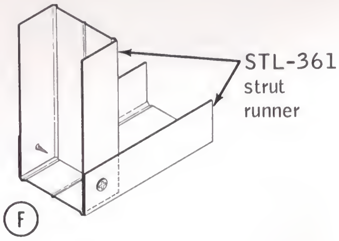

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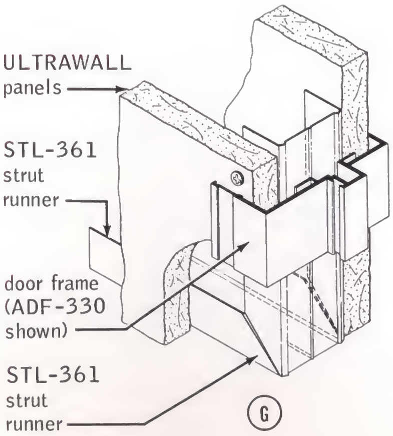

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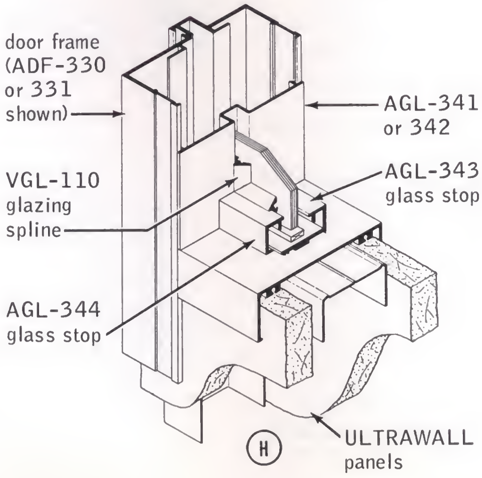

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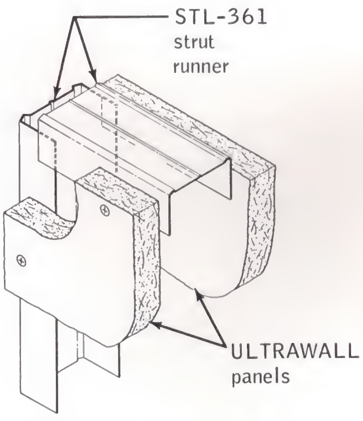
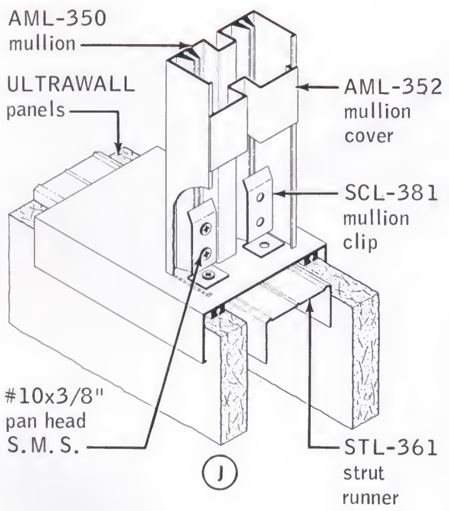
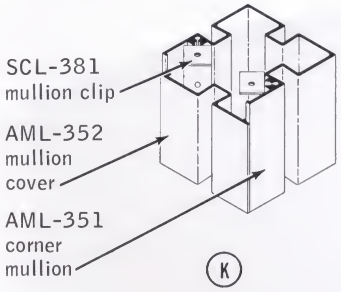
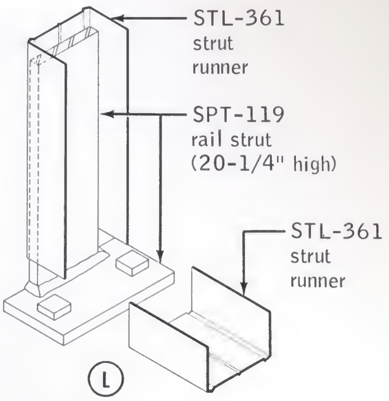


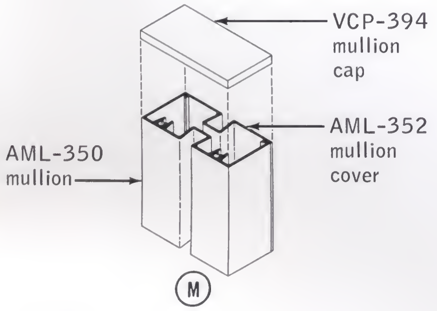
sub-framing of detail-H

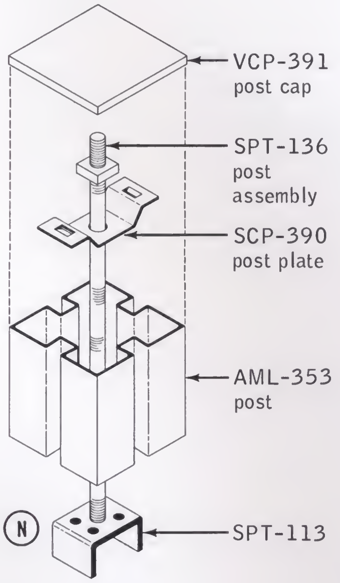
details—H-stud system

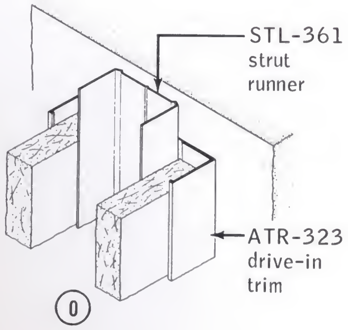


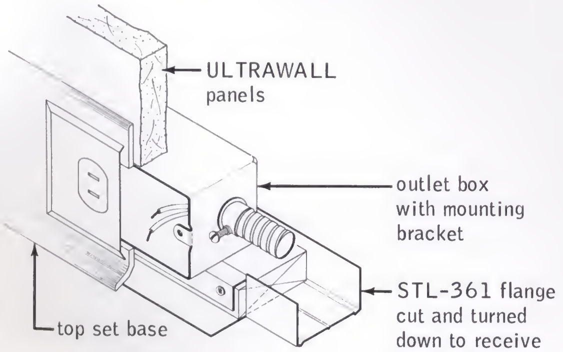




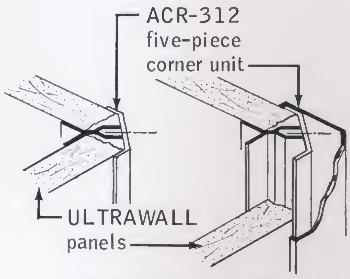




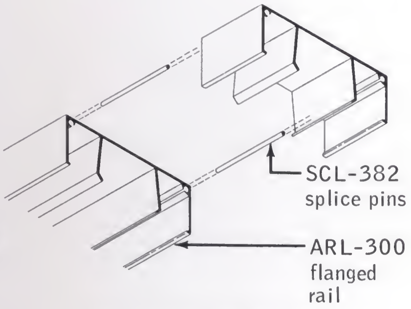




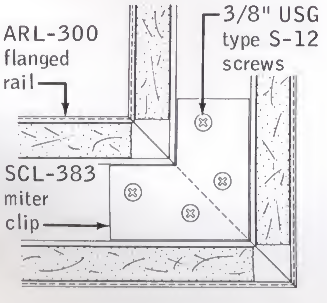
electrical outlet



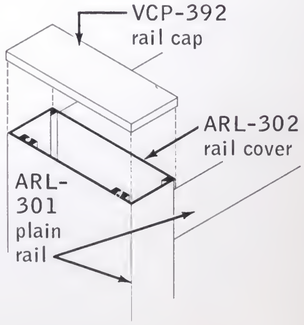
five-piece corner



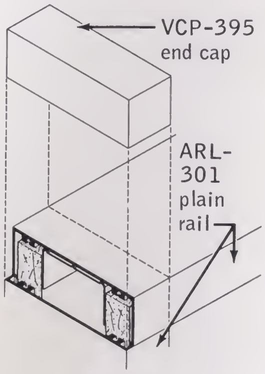
horizontal rail splice



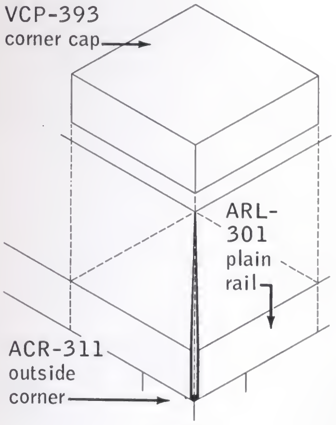
miter alignment clip
inside view, flanged rail



**rail
terminal**



**alt. rail
terminal**



**rail
corner**

SA 1020 ULTRAWALL Partition Systems

specifications

notes to architect

1. *USG Aluminum Door Frames for ULTRAWALL Partitions include three different types. All are available for both ceiling-height and door-height openings and come in two- and three-piece styles for hollow core and solid core doors in 1¾" thicknesses only.*

The USG SMR Aluminum Door Frames, both Delta and Gamma styles, are available with a snap-in header (2-pc.) for ceiling-height openings or milled header and mitered snap-on trim (3-pc.) for door-height openings. SMR Gamma also available in throat sizes from 3½" to 4⅞".

Both SMR frames are self-mortising and reversible. They include snap-in mortise closures, vinyl door mute, aluminum snap-in strike plate, hinge-attachment screws and adjustable hinge back-up plates (Delta only). Available in satin anodized and ULTRABRONZE finishes.

The ADF Aluminum Door Frame is non-reversible and comes in two- and three-piece styles, satin anodized finish only. The two-piece frame is for ceiling-height openings, furnished with hinges for 3′0″x7′0″ door and transom above. Also available with four hinges for ceiling-height door leaves on special order. Ends are cut square. Head is completed with a snap-in door header. Available in 10′ height, right or left-hand opening.

The three-piece ADF Frame is complete with mitered joints for 3′0″x7′0″ doors, right- or left-hand opening.

ADF non-reversible frames are supplied with concealed hardware including three 4½"x4" hinges and standard 2¾"x1⅛" strike and strike box (refer to ULTRAWALL Full-scale Details for template dimensions). Ball-bearing hinges are available and should be specified when closers are required; available with four hinges for ceiling-height doors on special order.

2. *The perimeters of movable partitions should be isolated from all structural members (except floor), and dissimilar wall or ceiling surfaces where structural movement may occur.*

3. *In certain areas where seismic design code requirements govern, consult local building codes for partition limitations.*

4. *Where this partition is used as a sound barrier, the use of USG Acoustical Sealant is recommended to seal all cut-outs, such as at electrical fixtures and to seal all intersections with the adjoining structure. Eliminate cutting holes back to back and adjacent to each other.*

5. *The addition of THERMAFIBER Sound Attenuation Blankets to the stud cavity, pressed tightly in place, stapled to the back side of one face of partition, will increase the sound transmission loss of the partition.*

6. **Fixture Attachment**—*Lightweight fixtures and trim should be installed using plastic plugs or other expandable anchors for screw attachment. Medium and heavyweight fixtures should be supported from the primary framing.*

7. **Electrical Fixtures**—*The depth of electrical boxes should not exceed 2½". Standard conduit and boxes may be used.*

8. *See U.S.G. product folders in this series: Paint Products Folder SA-933 for paint specifications, TEXTONE Gypsum Panel Folder SA-928 for vinyl colors and patterns.*

Part 1: general

1.1 scope—Furnish and erect ULTRAWALL Partitions as indicated on the plans and specified hereunder.

1.2 description of systems—Partitions shall be flush-panel type, 3⅜" thick, (railing, cornice, and/or ceiling height).

1.3 qualifications

a. Installation of ULTRAWALL Partitions shall be by a U.S.G.-licensed contractor.

b. All materials included herein, except as noted, shall be supplied by United States Gypsum Company.

1.4 submittals—The partition contractor shall submit shop drawings showing partition construction details.

1.5 delivery and storage of materials—All materials shall be delivered in their original unopened packages. Materials shall be stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

Part 2: products

2.1 materials

a. **Gypsum Panels**—ULTRAWALL Panels (plain) (vinyl-faced—specify color) ¾" thick by (24") (30") wide by appropriate height.

b. **Studs**—Roll-formed electro-galvanized steel (one-piece H-stud) (one-piece T-stud) (three-piece H/R stud).

c. **Floor Runners**—Roll-formed electro-galvanized steel to hold panels in alignment.

d. **Ceiling Runners**—One-piece extruded aluminum runner with formed-in spacers, and integral trim to conceal top edges of panels.

e. **Z-runners**—¾" Z-runners (not by U.S.G.) for attachment of third layer of panels.

f. **Attachment Clips**—SBS-153 Z-runner attachment clips.

g. **Top Set Base**—For adhesive application after panels have been erected and finished. (Base not by U.S.G.)

h. **Door Frames**—USG Aluminum Door Frames (two-piece) (three-piece), (ADF-non-reversible) (SMR-reversible Delta) (SMR-reversible Gamma), (color-anodized aluminum—not available in ADF).

i. **Doors**—Wood doors, 1¾" thick, 3′0″ by 7′0″ (left-hand opening) (right-hand opening). (Doors not by U.S.G.)

j. **Window Frames**—Sized as shown on plans and assembled from standard ULTRAWALL extruded aluminum parts. Glass furnished by (partition contractor) (glazing contractor).

k. **Aluminum Trim**—(Exposed trim members are etched and anodized with a permanent satin finish—AA-C22-A21) (ULTRABRONZE color-anodized aluminum—AA-C22-A32).

Part 3: execution

3.1 partition erection

a. **Studs and Runners**—Lay out the partition. Securely attach floor and ceiling runners. Accurately plumb strut studs at door openings and ULTRAWALL terminals.

b. **Gypsum Panels**—Install ULTRAWALL Panels, steel studs and trim members in accordance with United States Gypsum Company's installation directions.

c. **Workmanship**—Erect partitions so as to be rigid, plumb, with horizontal lines leveled, neat in appearance, and free from defects in workmanship. Conceal all connections to walls, floors, ceilings, cornice sections, and connections between gypsum panels. (Adjust all hardware to proper working order.)

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, THERMAFIBER, ULTRAWALL, TEXTONE, DURABOND, ULTRABRONZE. SMR is Reg. U.S. Pat. & Tm. Off. by Modulex, Inc.

NOTE: all products described here may not be available in all geographic markets. Contact your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM 101 South Wacker Drive, Chicago, Illinois 60606
BUILDING AMERICA

SA-1020/USG/rev. 4-77 Printed in U.S.A.

SA
1030

USG Demountable Drywall Partitions

for design versatility and economy

system folder

UNITED STATES GYPSUM
1976—1

10 P

DEMOUNTABLE PARTITION
drywall—metal stud

Attractive, easily moved partition units

Versatile USG Demountable Drywall Partitions offer all the benefits of a fixed partition—with mobility. They consist of removable gypsum panels supported on metal framing and finished with anodized aluminum components that provide non-load bearing, sound- and fire-rated partitions in ceiling, cornice, and bank rail heights.

Ready Mobility—USG Demountable Partitions disassemble and assemble in a matter of hours without costly material replacement. Meet building and tenant requirements now and in the future. Most components are salvageable and reusable. Provide the performance of permanent walls without the design restraint of a rigid space plan.

Versatile and Elegant—USG Demountable Partitions can be completed on one side, the opposite side left open and finished later to suit tenant's desire for color or pattern. A broad range of TEXTONE Gypsum Panel vinyl facings in five textures, 27 colors and a wide choice of handsome, designer-styled finish components are fully adaptable to any installation. Standard gypsum panels, decorated on the job, also may be used. Glazing is added as needed.

Engineered for Quick Installation—Contractors find USG Demountable Systems similar to drywall fixed-partition construction. Jobs move with record speed for earlier occupancy. The 2½-in. wall cavity provides ample space for electrical and other services. Individual gypsum wall panels can be removed for easy access to utilities, and easily replaced.

All-Around Economy—*Low initial costs,* because fewer components reduce material needed, and the use of factory-laminated TEXTONE Vinyl-Faced Panels shortens finishing time. USG Demountable Partitions weigh only 5.5 lbs. per sq. ft. (when faced each side with ½-in. gypsum panels). Ready availability of components reduces possibility of schedule delays due to delivery. *Maintenance costs are minimal* with scuff-proof, washable vinyl surface; aluminum components are anodized for permanent, cleanable finish. *Relocation costs are low* because reusable USG Demountable Partitions can be simply relocated without the waste factor of fixed partitions.

Rated Assemblies—USG Demountable Partitions offer greater privacy and meet most sound-control requirements with high sound ratings. They are noncombustible—meet most building codes and add greater safety with 1-hour fire resistance ratings, including an assembly with battens at 4-ft. intervals for wider paneled effect. See table below for values.

fire and sound ratings

assembly description	test no.	fire rating	STC rating
½" vinyl-faced TEXTONE FIRECODE "C" gypsum panels & battens screw-attached—2½" USG steel studs 24" o.c.—2" THERMAFIBER sound attenuation blankets; wt. 6; width 3½".	UL Des U406 (was 21-1 hr.) TL-63-127(1)	1 hr.	49
½" vinyl-faced TEXTONE FIRECODE gypsum panels & battens screw-attached—2½" USG steel studs 24" o.c.; wt. 5½; width 3½".	TL-63-126(1)		42
½" SHEETROCK FIRECODE "C" gypsum panels & battens 4' o.c.—panels screw-attached at joints, with DURABOND 300 Adhesive on intermediate studs—2½" USG steel studs 24" o.c.—2" THERMAFIBER sound attenuation blankets; wt. 6; width 3½".	U of C 7/27/70(2)	1 hr.	

(1) Riverbank Acoustical Laboratories (2) University of California

limitations

1. Non-load bearing.
2. Not recommended for use where normally exposed to excessive moisture.
3. Limiting height (ceiling height partition): 12 ft.; 10 ft. when using ABS-114 recessed base. Limiting width for borrowed lights: 48 in.
4. Because cornice and bank rail height movable partitions are more flexible than permanent partitions, certain precautions must be taken to resist lateral and impact loads.
5. On cornice height partitions, the limiting unrestrained length between supports, including cornice height with door openings joined by continuous top rail, should not exceed 14 ft. Rails should not be spliced within 14 ft. unrestrained lengths.
6. Unless SPT-119 Rail Struts are used 10 ft. o.c., maximum recommended bank rail partition lengths are: 15 ft. with both ends terminating against a perpendicular wall, column or corner section; 10 ft. with one or both ends free-standing and SPT-119 Rail Strut at free ends.

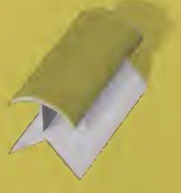
Copyright 1976, United States Gypsum Company

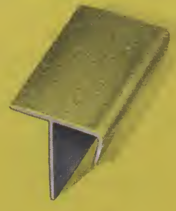
Complete line of finish components

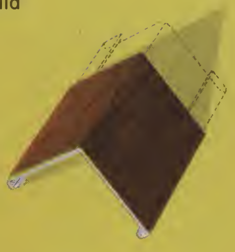
Choose from standard battens and trim designs; or select from ⅜-in., ½-in. and ⅝-in. TEXTONE Mouldings in extruded aluminum (AV series), vinyl plastic (PV-1 series) and steel (SV series).

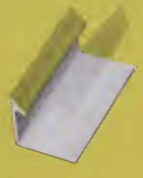
Additional options are low-cost, precision-extruded plastic mouldings in factory-laminated vinyl (RPV series) and solid colors (RP series)—ivory, tan, chocolate and black.

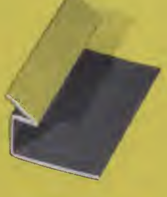
Also available: glazing components, matching posts, mullions and post caps, and even a specially designed picture moulding.

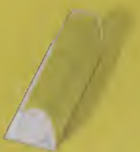

Outside Corner
AV-1

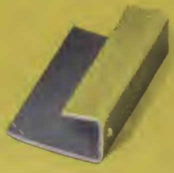

Outside Corner
RP-1, RPV-1

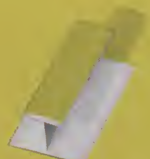

Snap-On Corner
AV-5, RP-5, RPV-5

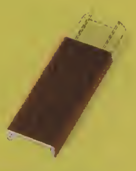

Inside Corner
AV-2


Inside Corner
RP-2, RPV-2

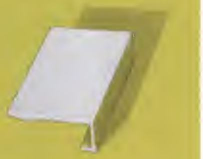

End Cap
AV-4


End Cap
RP-4, RPV-4
SV-401, SV-402


Divider
AV-3, RP-3, RPV-3


Snap-On Batten
AV-7, RP-7, RPV-7

Rigid Vinyl Trim
PV-1


Ceiling Drive-In Trim
AV-46

Neat-appearing aluminum base snaps into place on clips attached to conventional USG Steel Runner. Available either 2½-in. or 3½-in. high, it is complemented by matching drive-in ceiling trim. Batten can be used with accent-black or neutral-gray vinyl insert. Screwheads in door frame are concealed by same means.

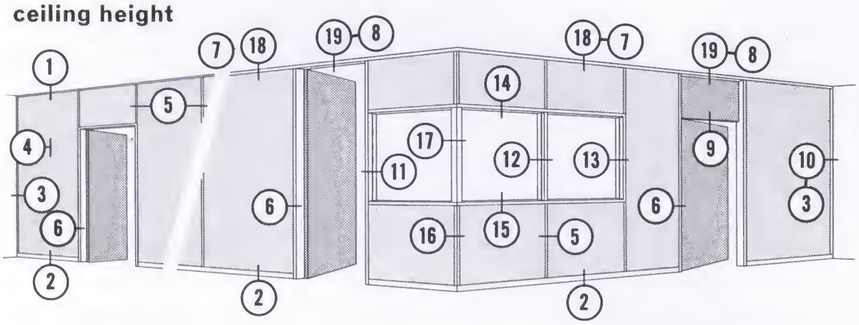
Unique one-piece combination recessed base and floor runner, used with matching recessed ceiling runner, creates a truly contemporary partition. Shadow-line detail of recessed ceiling runner is similarly effective.

Three-piece door frame, with no exposed fasteners, features concealed hinges. Here, black insert contrasts boldly with the door.

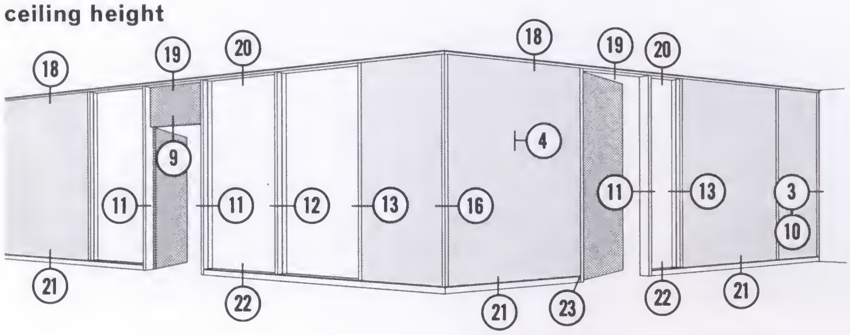
elevations/details

scale: 3" = 1'-0"

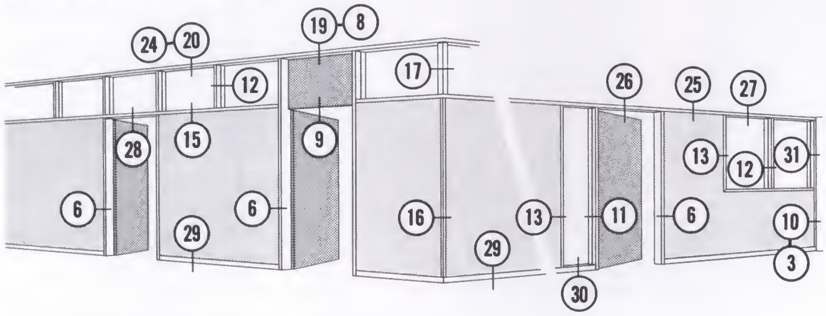
ceiling height



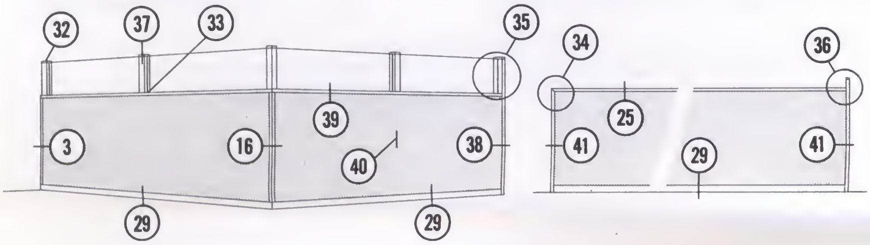
ceiling height

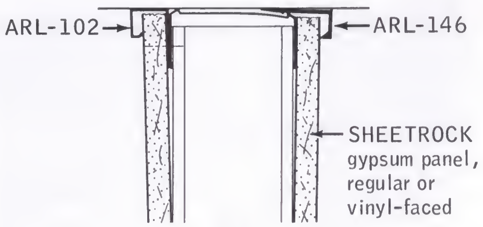


glass above cornice / cornice height



rail height





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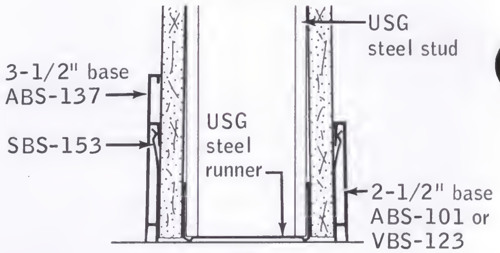

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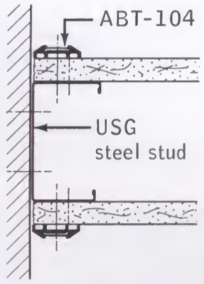

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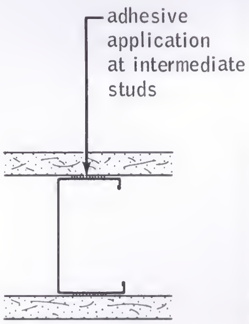

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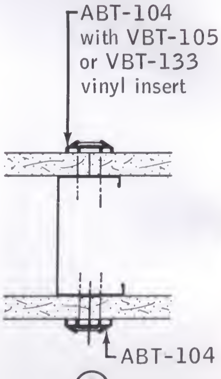

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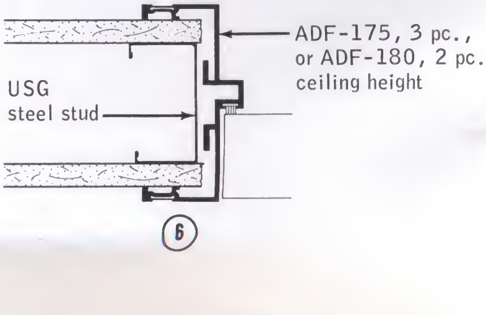
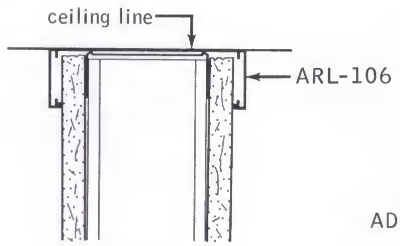


⑥

details



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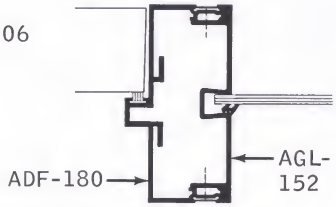

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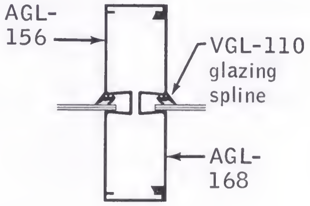

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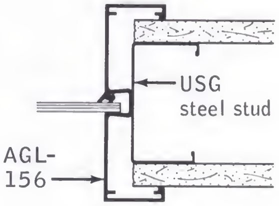

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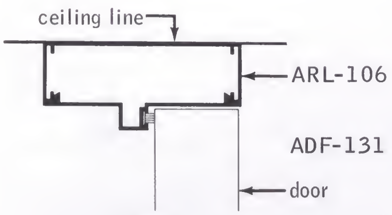

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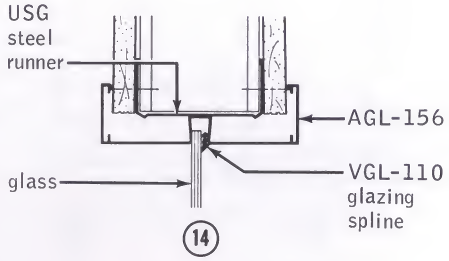

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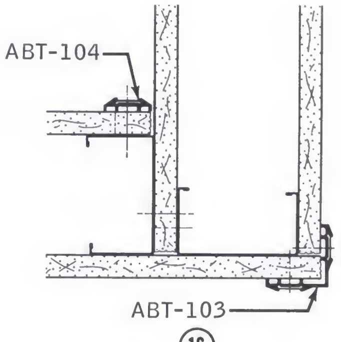

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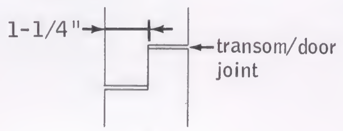

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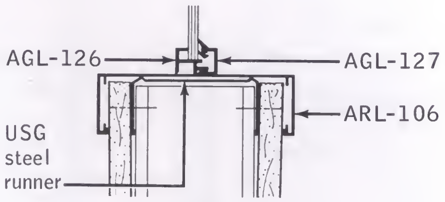

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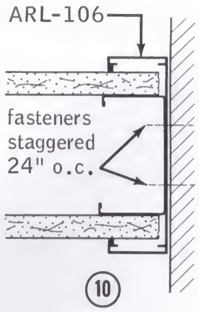

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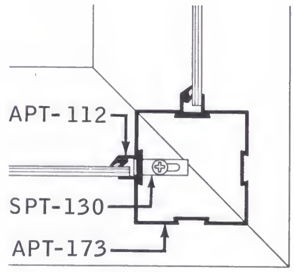

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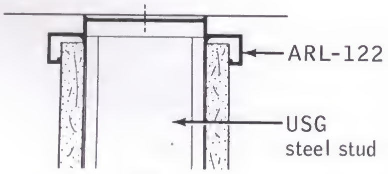

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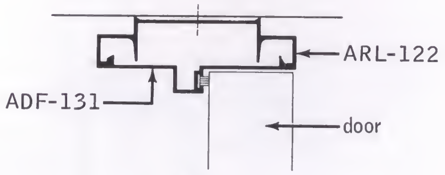

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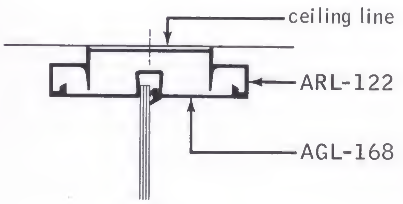

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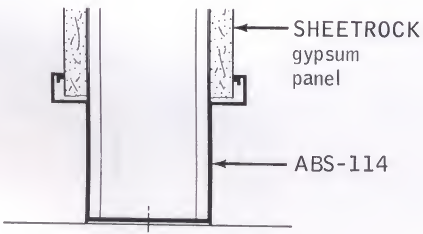

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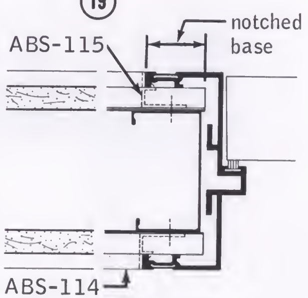

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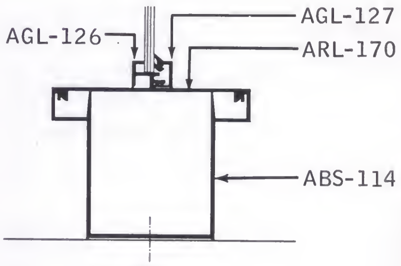

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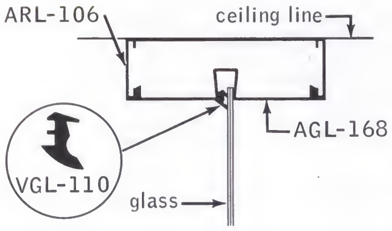
details

scale: 3" = 1'-0"



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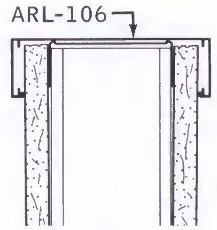

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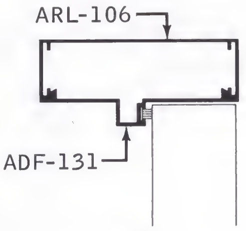

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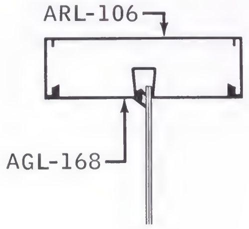

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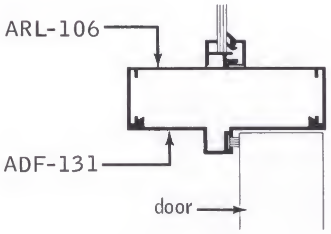

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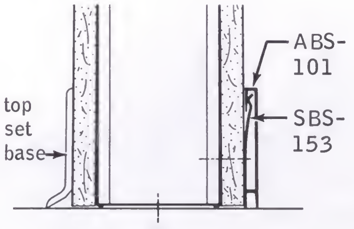

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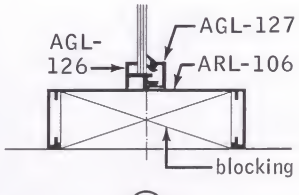

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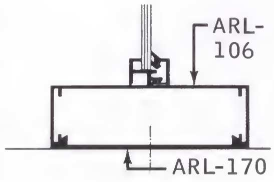

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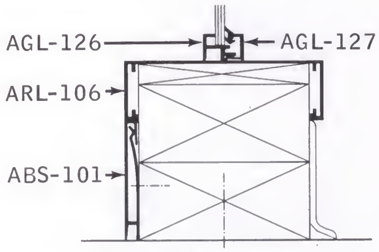

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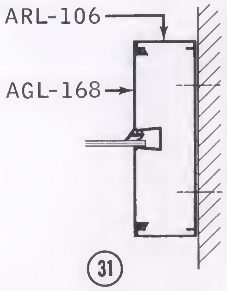

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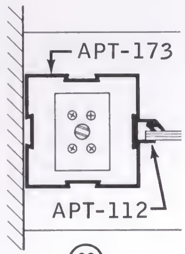

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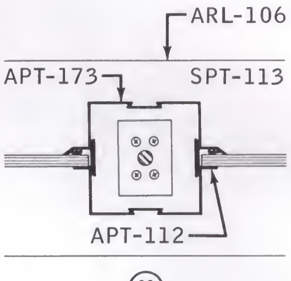

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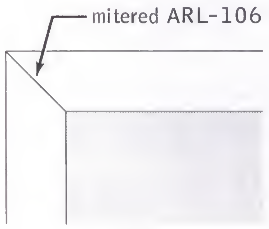

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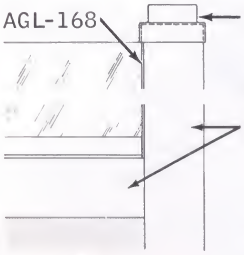

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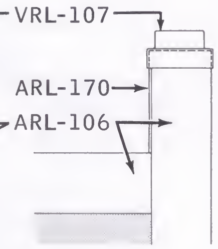

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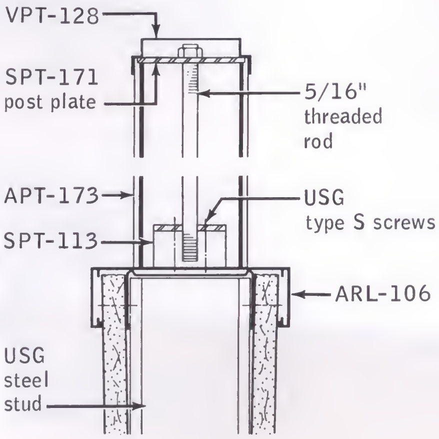

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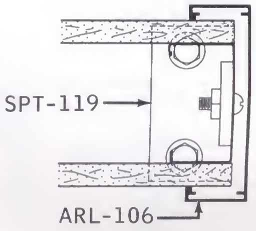

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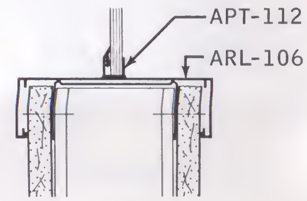

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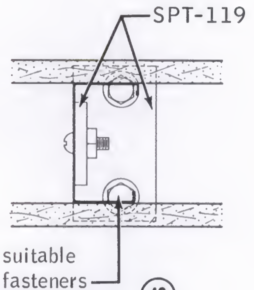
details



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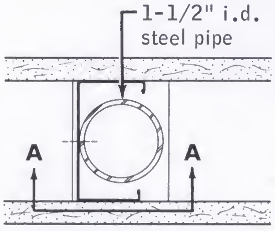

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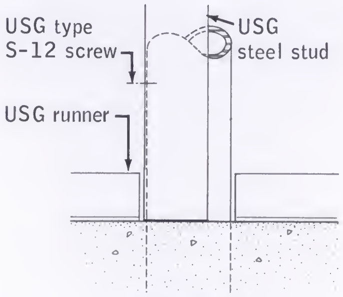
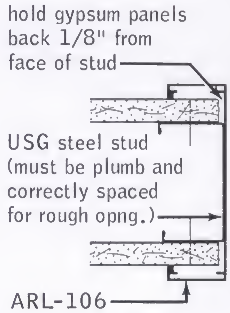
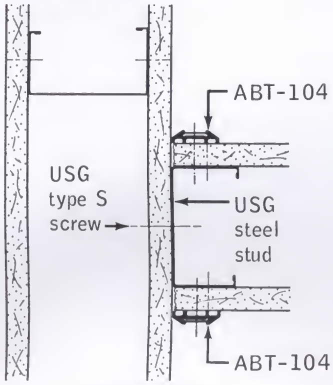


section-AA

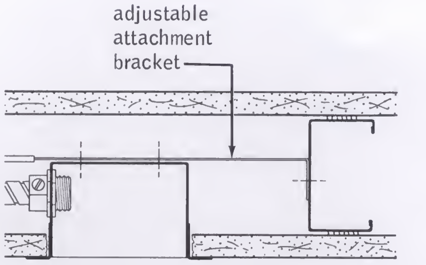

hold gypsum panels back 1/8" from face of stud
USG steel stud (must be plumb and correctly spaced for rough opng.)
ARL-106

㊶

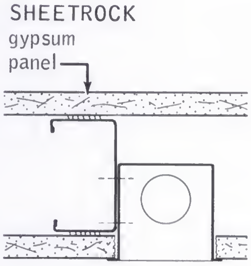
miscellaneous



intersecting partition

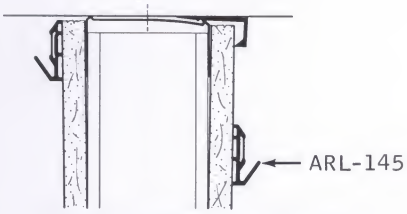


outlet box

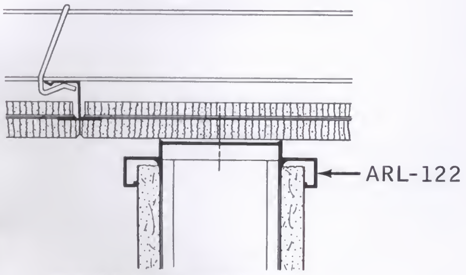


outlet box (alternate)

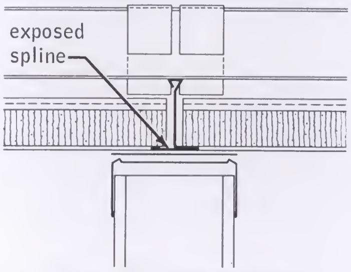
suspended ceiling attachments



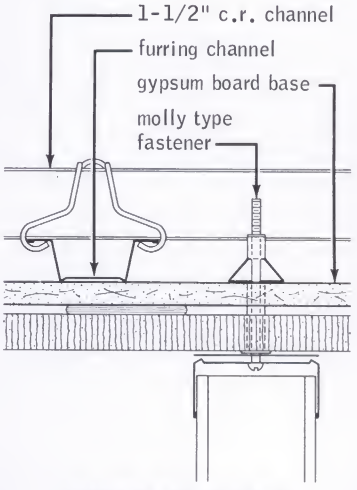
picture moulding application

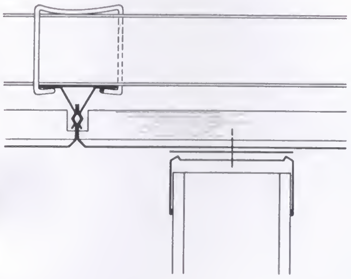


concealed grid system for acoustical tile

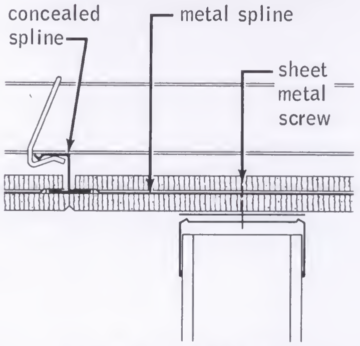


exposed grid system for acoustical tile & board





metal pan system



concealed grid system for acoustical tile

adhesively applied acoustical tile

specifications

notes to architect

1. *USG Aluminum Door Frames, furnished in three pieces for 3'0"x6'8" and 3'0"x7'0" openings; two pieces for ceiling height openings for 7' doors with transom above, are recommended. These frames will accommodate hollow core and solid core doors in 1¾" thicknesses only. Frames are supplied with concealed hardware including three 4½"x4" hinges and standard 2¾"x 1⅛" strike and strike box. Four hinges, for ceiling-height doors, available on special order. Ball-bearing hinges are available and should be specified when closers are required.*

2. *Maximum size for glass on glazed bank rail partitions is 20"x48". When glass exceeding 20" height is required, a continuous top runner must be used as in a glazed cornice height partition. Obtain glass manufacturer's recommendations for maximum number of panels in a run.*

3. *Additional chases for electrical conduit or pipe can be provided by cutting round holes no greater in size than 75% of the stud width, located in the center of the stud web and spaced at least 12" apart. Additional holes should not be cut where a fire rating is required.*

4. *Where this partition is used as a sound barrier, the use of caulking or foam gasketing to seal all cut-outs, such as at electrical fixtures and to seal all intersections with the adjoining structure is recommended. Eliminate cutting holes back to back and adjacent to each other.*

For maximum sound isolation the partition should extend from structural slab to structural slab, closing all openings.

5. Fixture Attachment—*Lightweight fixtures and trim should be installed using plastic plugs or other expandable anchors for screw attachment. Medium and heavy weight fixtures should be supported from the primary framing.*

6. *For adhesive applications of TEXTONE Gypsum Panels, only DURABOND Adhesives are recommended; other adhesives may not be compatible with the vinyl surface.*

7. *See U.S.G. product folders in this series: Paint Products Folder for paint specifications, TEXTONE Gypsum Panel Folder for vinyl colors and patterns. See USG Demountable Components Directory, WB-1264, for system accessories; Installation Manual, WB-1288, for directions.*

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 description of systems

Partitions shall be 3½" thick (railing, cornice and/or ceiling height).

1.3 qualifications

All materials herein specified, unless otherwise indicated, shall be manufactured by United States Gypsum Company and shall be installed in accordance with their current printed directions and specifications.

1.4 environmental conditions

In cold weather, the building shall be heated well in advance of and during application of gypsum panels and adhesives to maintain a temperature in the range of 55° to 70°F., and ventilation shall be provided to eliminate excessive moisture.

1.5 submittals

The partition contractor shall submit shop drawings showing the planned layout and partition construction details.

1.6 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

Part 2: products

2.1 materials

a. **Studs**—galvanized USG Steel Stud No. 212ST5 (2½").

b. **Steel Runners**—floor and ceiling, galvanized USG Steel Runner No. 212ST5 (2½"), with 1¼" flange.

c. **Gypsum Panels**—½"x48" wide, square edge SHEETROCK (Regular or FIRECODE) Gypsum Panels; ½"x48" wide TEXTONE (Regular or FIRECODE) Vinyl Panels.

d. **Fasteners**—USG Brand Screws, types as required.

e. **Panel Adhesive**—DURABOND 300 Adhesive.

f. **Aluminum Trim**—Base, battens, corners, glazing and other trim members—standard USG Demountable Partition Components—etched and anodized, permanent satin finish.

g. **Door Frames**—USG Aluminum Door Frames (two-piece) (three-piece).

Part 3: execution

3.1 partition erection

a. **Studs and Runners**—Lay out the partition. Securely attach floor and ceiling runners. Accurately plumb studs at door openings and terminals.

b. **Gypsum Panels**—Install gypsum panels, steel studs and trim members in accordance with United States Gypsum Company's installation directions.

c. **Workmanship**—Erect partitions so as to be rigid, plumb, with horizontal lines leveled, neat in appearance, and free from defects in workmanship. Conceal all connections to walls, floors, ceilings, cornice sections, and connections between gypsum panels. (Adjust all hardware to proper working order.)

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE, TEXTONE, THERMAFIBER, DURABOND.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM 101 South Wacker Drive, Chicago, Illinois 60606
BUILDING AMERICA

SA-1030/USG/1-76 Printed in U.S.A.

10.1/Vau

Vaughan Walls

VAUGHAN WALLS, INC.
1977—1

10 P
DEMOUNTABLE PARTITION
gypsum partitions

Monolithic painted wall relieved by full-height doors and an exposed ceiling runner in dark finish sets off soothing color scheme of 2900 Series fixed partitions.

Beauty of function is vividly portrayed in use of wall color and door arrangement in 700 Series installation.

Modular versatility opens more doors to creative interiors– distinctive and durable

VAUGHAN WALLS are high-performance interior gypsum partitions for office, institutional and school buildings that combine the design flexibility of movable walls with permanent wall appearance and service. Developed for modern, functional beauty, VAUGHAN WALLS Partitions offer the advantages of crisp, clean lines and outstanding fire and sound resistance.

Specially engineered gypsum panels are manufactured by United States Gypsum Company to meet the rigid tolerances and specifications of Vaughan Walls, Inc. The panels are job-laminated and assembled with architecturally designed aluminum extrusions, floor and ceiling runners, door frames and glass sections—the result of years of continual refinement—to provide several basic systems:

700 Series—Movable partitions featuring minimum trim projection and a contemporary low profile appearance. Simplicity and grace make the 700 Series a popular choice. Available in 2¼-in. chase wall and 3-in. sound wall.

2700 Series—Fixed partitions incorporating the smooth planes and flat, simple trim of contemporary design, yet highly competitive with conventional drywall construction. These systems intermix with the 700 Series door frames and glazing extrusions for complete design continuity while taking advantage of fixed partition economy where movability is not required. Available in 2¼-in. chase wall and 3¾-in. sound wall.

900 Series—Movable partitions offering projected aluminum trim designed to accentuate door units and glazed walls. The clean, crisp lines of this system have made it the style leader in the industry. Available in 2¼-in. chase wall and 3-in. sound wall.

2900 Series—Fixed partitions providing a completely smooth monolithic surface. They also feature the unmatched elegance and clean profiles of 900 Series door frames and glazing extrusions. Competitively priced with conventional drywall, these systems offer design continuity for maximum compatibility with other VAUGHAN WALLS systems. Available in 2¼-in. chase wall and 3¾-in. sound wall.

Low Rail Series—Movable partitions with prefinished panels accented by anodized aluminum trim. Ideal for use in bank rails, landscape office planning or as privacy screen for secretarial and clerical pools. Installs quickly over carpet or resilient tile. Available in 2¼-in. thick panels (24- or 30-in. wide).

All installations are made by licensed VAUGHAN WALLS contractors, specially trained to provide expert design consultation, prompt installation and fine craftsmanship. Features:

Versatile—Ceiling, door and bank rail heights are available. Glass panels can be used in almost any combination. These highly adaptable units serve every partition need from modular panels with V-joints—for low-cost utility and ready movability—to permanent monolithic walls with custom finishes.

Copyright 1977, United States Gypsum Company

Door openings may be located anywhere and walls may intersect anywhere for complete freedom in space planning and design. Electrical and telephone services are easily carried within the partitions; outlets may be placed where needed.

Beautiful—All exposed aluminum members are satin-buffed and anodized in rich shades of aluminum, bronze and black. These attractive finishes complement the variety of panel surfaces that may be used.

Surface finish materials include vinyls; ⅛-in. wood veneers for smooth, permanent walls; Vaughan Walls Wood Wrap veneer for movability; paint; or any wallcovering of the decorator's choice.

Design Flexibility—These systems meet virtually all design requirements. Matching walls can be added at any time. Existing wall arrangements can be modified—from ceiling height to cornice or bank rail heights. Door openings and glazing can be added or removed to suit changing light or privacy requirements.

Movable Vaughan Walls Partitions present the sturdy, solid appearance of fixed partitions and easy, prompt mobility on either side for future space requirements. All components are virtually 100% reusable.

Economical—Vaughan Walls Partitions are ready for immediate installation. There is no expensive inventory needed—all components are supplied as required. Partition cost is usually much less—for the same fire and sound performance—than other movable partitions. Handsome surfaces require little maintenance, take abuse and still look new.

Fire Resistant—Fire-resistance ratings of 1 hour have been established (see table page 5). Conformance to building codes is assured, and reduced insurance rates are frequently possible. The 700 Series aluminum door frame assembly carries a UL label for Class C fire doors. All other Series offer frames approved by ICBO for use in 1-hour partition construction.

Sound Control—These systems create an atmosphere for efficient office performance—maximum privacy for libraries and conference rooms. Versatile Vaughan Walls Partitions with sound ratings ranging from 37 STC to 45 STC (see table page 5), offer more effective sound control than many other movable or permanent partitions. Other sound walls with ratings up to 61 STC are also available.

Dependable—A nationwide network of licensed Vaughan Walls contractors, with locally stocked aluminum components and U.S.G. plants and warehouses strategically located throughout the country, make Vaughan Walls Partitions readily available for fast, reliable delivery. Finish material can be ordered when job is planned—delivered when needed.

limitations

1. Vaughan Walls Partitions are intended for use only as non-load bearing walls.

2. Maximum height is 12 ft.; 10 ft. for sound walls.

3. Maximum unsupported run for less-than-ceiling-height and glazed cornice-height partitions is 14 ft.; for Low Rail Series, 8-ft. with freestanding end, 14-ft. with support restraint at both ends.

4. Vaughan Walls Partitions should not be used where normally exposed to moisture or excessive humidity.

Ceiling-height door in combination with full-height clear glass sidelight and low-profile 700 Series trim gives spaciousness and importance to office entry. Richly finished wood bank rail adds effectiveness.

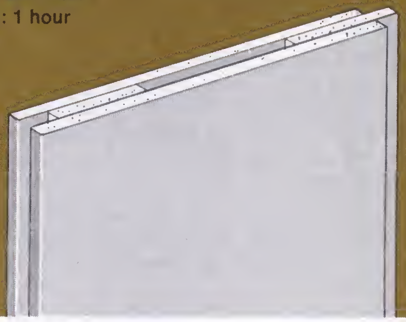
Wood veneer doors matched in sequence to center dividing panel are flanked by full-height opaque glass in this office arrangement. Projected 900 Series trim accents each unit.

Basic Vaughan Walls Gypsum Partitions

Movable

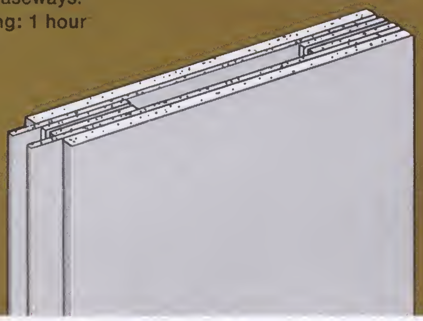
2¼-in. Chase Wall (700 and 900 Series)

Excellent corridor partition or tenant wall preferred when economical chaseways are desired for addition of future electrical requirements. Two layers of specially engineered VAUGHAN WALLS gypsum face panels are laminated to coreboard strips forming a tongue-and-groove panel assembly. Construction provides internal chaseway for electrical and telephone services.
Fire rating: 1 hour
STC: 37



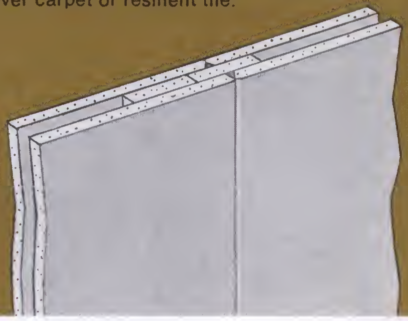
3-in. Sound Wall (700 and 900 Series)

Space-saving party or privacy wall; also used in library and conference rooms. Four layers of VAUGHAN WALLS gypsum panels are laminated to double coreboard strips forming two rows of tongue-and-groove panels. Special sound seals. Either side independently movable so walls can be finished separately. Electrical and telephone services are carried in panel chaseways.
Fire rating: 1 hour
STC: 45



2¼-in. Low Rail Partition Series

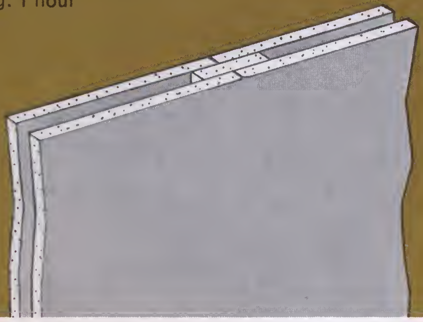
Factory-fabricated and field-assembled. Entirely self-supporting and easily moved and reassembled. Series consists of 24-in. or 30-in. wide prefinished ⅝-in. VAUGHAN WALLS bevel-edge gypsum face panels, laminated to coreboard strips forming a tongue-and-groove panel assembly. Low profile aluminum trim with black inserts in posts for accent. Installed over carpet or resilient tile.



Fixed

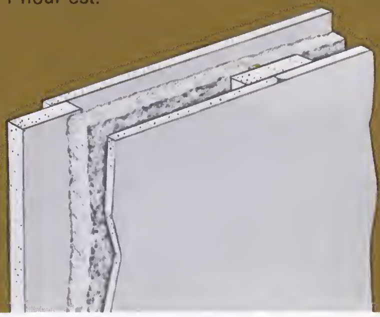
2¼-in. Chase Wall (2700 and 2900 Series)

Excellent semi-solid fixed corridor partition or tenant wall where economy and smooth surface are desired; mobility not important. Two layers SHEETROCK FIRECODE gypsum panels laminated in place to coreboard strips. Electrical and telephone services are carried in internal chaseway.
2900 Series rated as shown.
Fire rating: 1 hour
STC: 37



3¾-in. Sound Wall (2700 and 2900 Series)

Excellent fixed party wall, privacy partition or conference room wall. Two rows of SHEETROCK gypsum panels laminated and stapled to coreboard strips at joints. Neoprene isolators and 1-in. insulation blankets in cavity. Electrical and telephone services are carried in internal chaseway. 2900 Series rated as shown.
Fire rating: 1 hour est.
STC: 45



Unique flexibility at low cost makes Low Rail Partitions ideal for secretarial cubicles, work stations and clerical pools. Entirely self-supporting, no permanent floor connections required. Factory-fabricated to fit modular or random layouts.

Glazed walls give executive office an inviting, open quality. Bronze framing is accented by black ceiling runner which creates visual recess between wall and ceiling.

fire and sound ratings

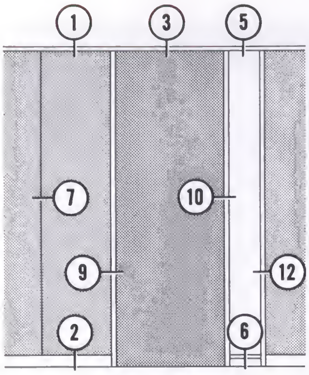
assembly description	test no.	fire rating	STC rating (16-freq.)
Movable VAUGHAN WALLS pre-chased partition 700 and 900 Series—special ⅝″ USG gypsum face panels laminated to special 1″ gypsum core strips placed to form panel joints wt 7 width 2¼″	U of C 11-1-66(1) WL-73-59160(2)	1 hr.	37
VAUGHAN WALLS chase wall fixed partition 2700 and 2900 Series—⅝″ SHEETROCK FIRECODE gypsum face panels laminated to special 1″ gypsum core strips at vertical joints wt 7 width 2¼″	U of C 8-6-71(1) WL-73-59160(2)	1 hr.	37
Movable VAUGHAN WALLS pre-chased sound wall 700 and 900 Series—special ⅝″ USG gypsum face panels laminated to ⅜″ gypsum base layer panels—½″ gypsum core strips placed to form panel joints—2 rows 1½″ thick—aluminum trim wt 10 width 3″	U of C 8-12-68(1) WEAL 67-131(3)	1 hr.	45
VAUGHAN WALLS sound wall fixed partition 2700 and 2900 Series—two rows ⅝″ SHEETROCK gypsum face panels laminated and stapled to special 1″ gypsum core strips at vertical joints— neoprene isolators and 1″ insulation blankets in cavity wt 5 width 3¾″	WEAL 72-148(3)	1 hr. est.	45

(1) University of California. (2) Wyle Laboratories. (3) Western Electro-Acoustic Laboratory, Inc.

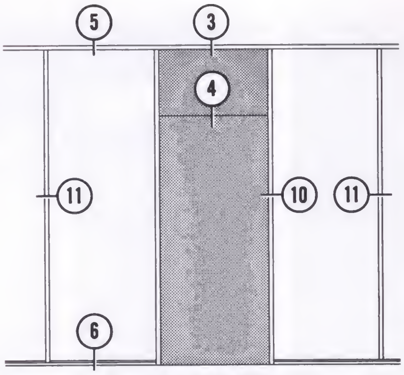
sound transmission loss—db

test no.	method	band center frequency—Hz																STC
		125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	
WEAL 72-148	Lab	23	26	31	38	43	44	49	50	52	51	52	52	44	44	48	51	45
WEAL 67-131	Lab	22	27	31	35	39	43	43	45	46	48	47	46	49	52	55	56	45
WL-73-59160	Lab	24	19	19	27	32	32	36	37	40	41	42	41	38	38	39	41	37

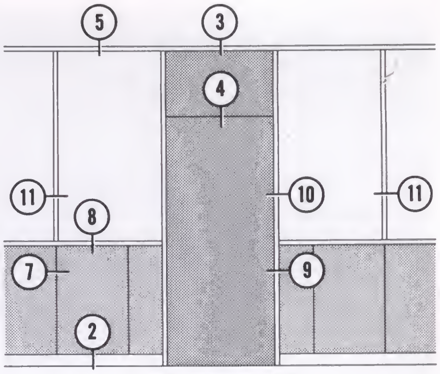
elevations



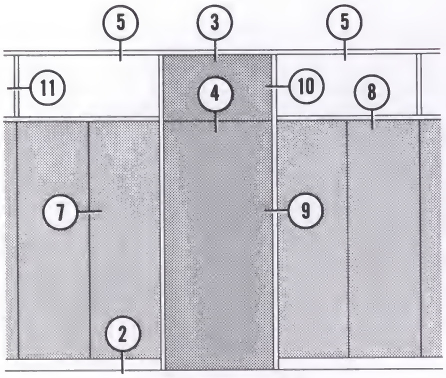
ceiling height
full height door
adjoining glass panel



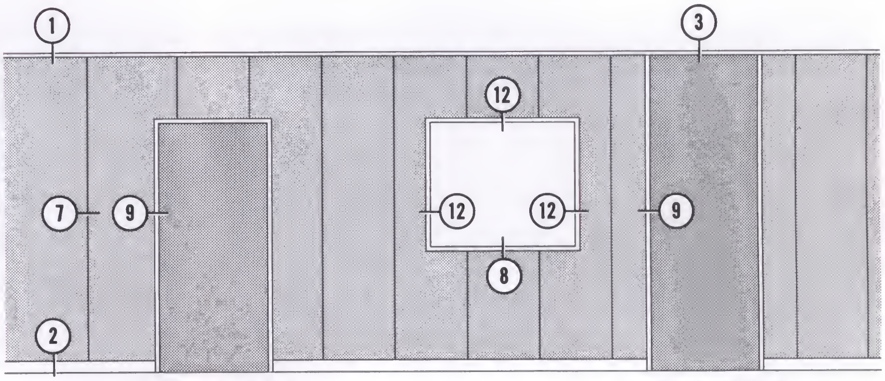
ceiling height
door w/fixed transom
full height glass panels



ceiling height
door w/fixed transom
glass above gypsum panels

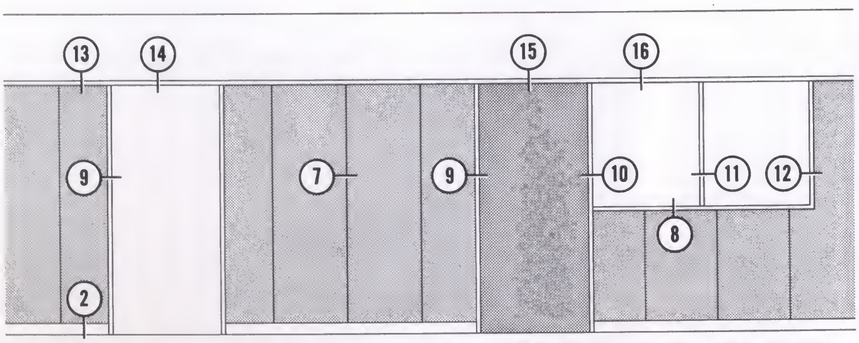


ceiling height
door w/fixed transom
glass above cornice



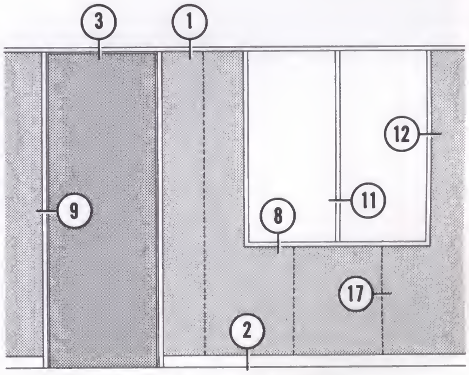
ceiling height
door in gypsum walls

ceiling height
full height door/gypsum walls



door height—cased opening

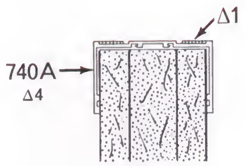
door height—gypsum walls with glass



ceiling height
full height door/taped joints

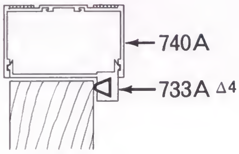
details/2¼″ chase wall (700 series)

scale: 3″ = 1′-0″

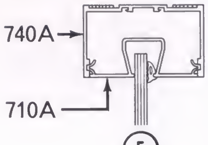


①

③ choice of a or b



③A



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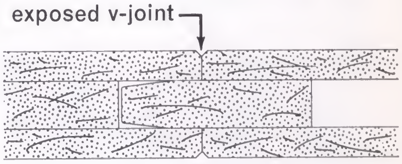
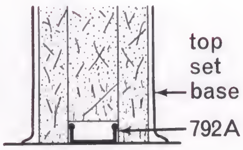


⑦

1 Hr.—U of C 11-1-66



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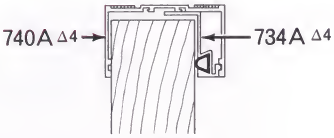
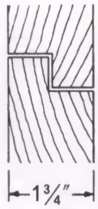
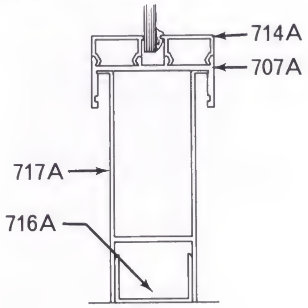


③B

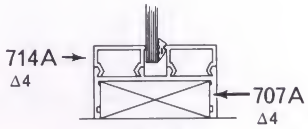


④

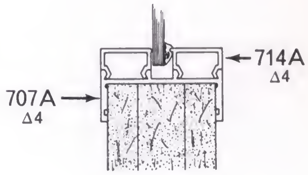
⑥ choice of a or b



⑥A



⑥B



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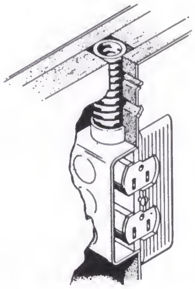
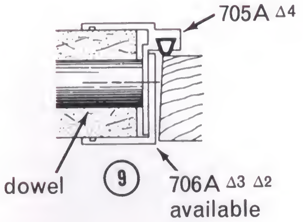


electrical outlet



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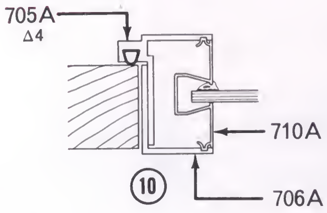

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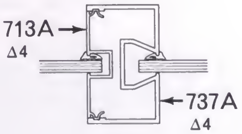

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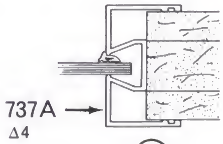

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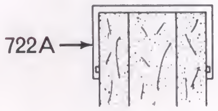

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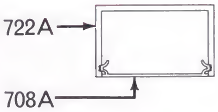

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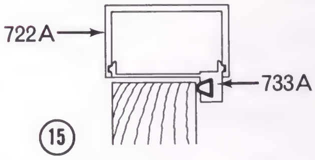

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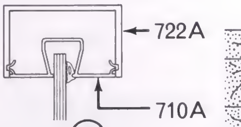

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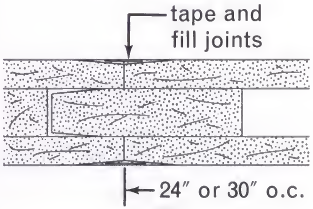
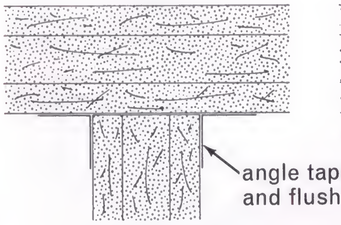


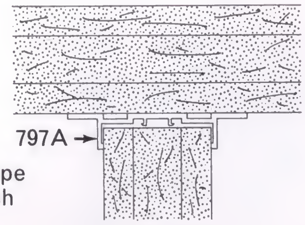
⑰

1 Hr.—U of C 11-1-66

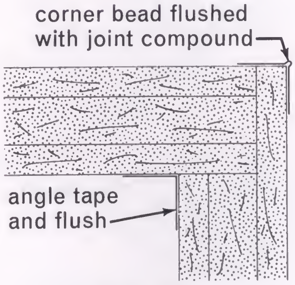
wall intersections and corners (700 and 900 series)



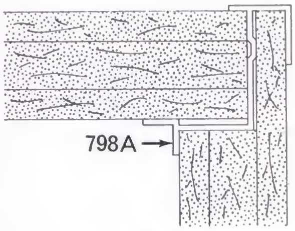
painted panels
(joints treated)



vinyl panels



painted panels
(joints treated)



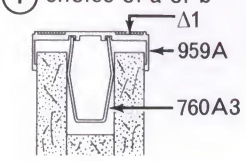
vinyl panels

Δ1—⅛″ Polyurethane Gasket
Δ2—30-min. ICBO Approval
Δ3—45-min. Underwriters "C" Label
Δ4—Also available for 3″ sound wall

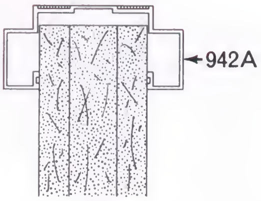
details/2¼″chase wall (900 series)

scale: 3″ = 1′-0″

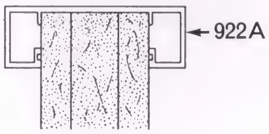
① choice of a or b



①A



①B



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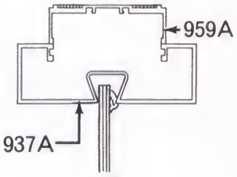
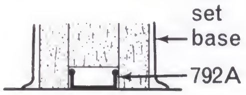
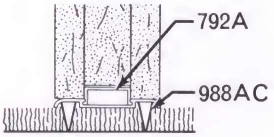


⑤

② choice of a or b



②A



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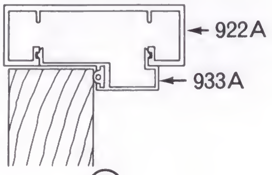

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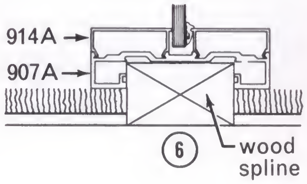
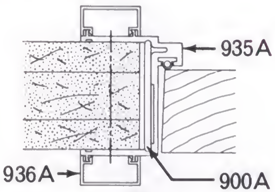
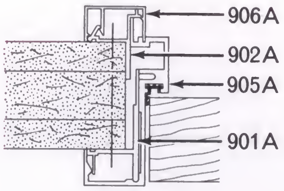


⑥

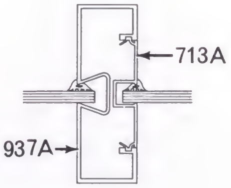
⑨ choice of a or b



⑨A Δ2



⑨B Δ2



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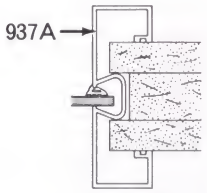
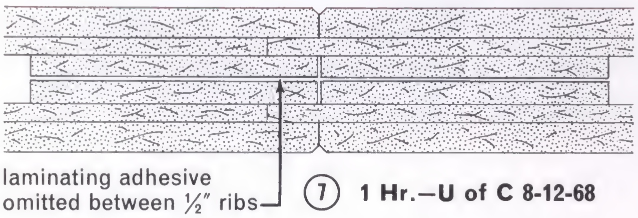
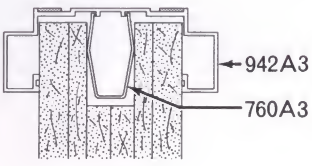


⑫

details/3″ sound wall (700 and 900 series)

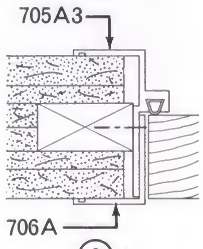


⑦ **1 Hr.—U of C 8-12-68**



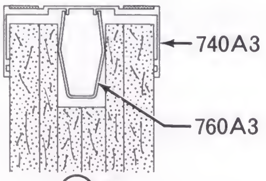
①C

⑨ choice of a, b or c

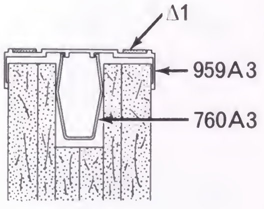


⑨A

① choice of a, b or c

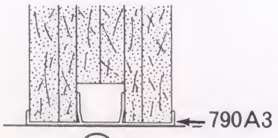


①A

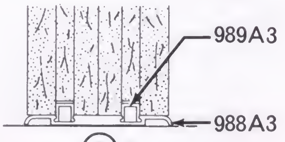


①B

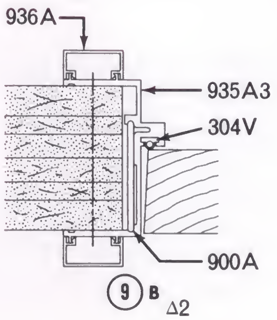
② choice of a or b



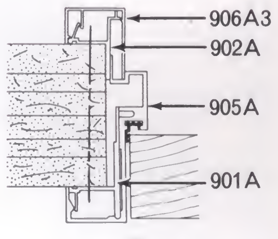
②A



②B



⑨B Δ2

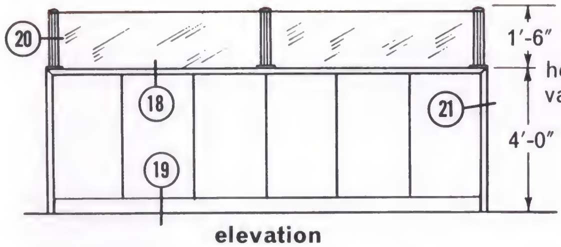


⑨C Δ2

Δ1—⅛″ Polyurethane Gasket
Δ2—30-min. ICBO Approval

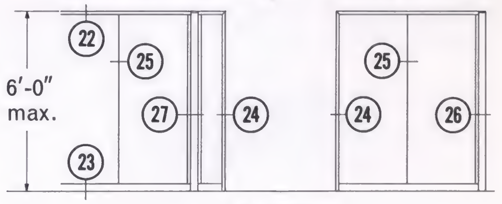
See page 7 for other 3″ sound wall profiles

details/bank rail partition (700 and 900 series)

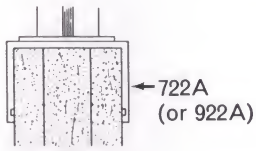


elevation

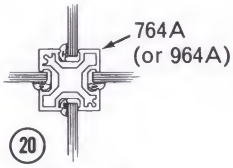
details/low rail partition series



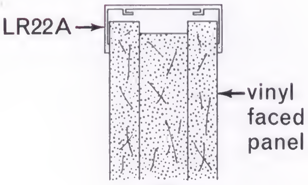
elevation



⑱



⑳ **glazed 1, 2, 3, & 4 way**



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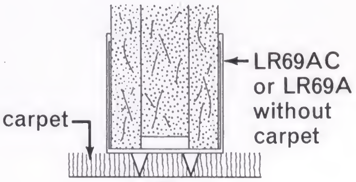

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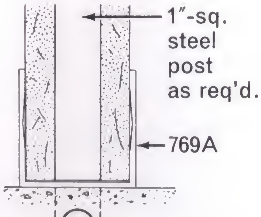

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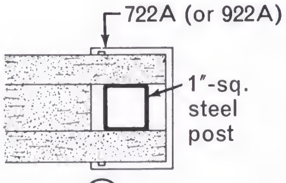

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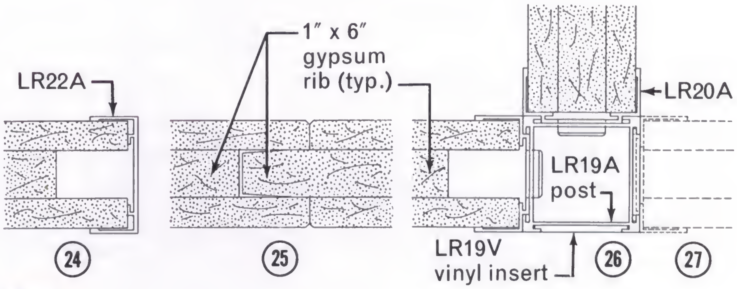

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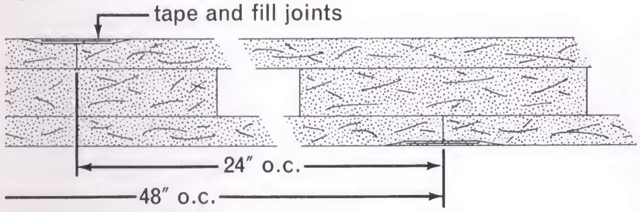
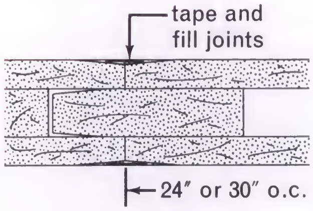
details/2¼″ chase wall (2700 and 2900 series)

Note: extrusions illustrated are for the 2900 series

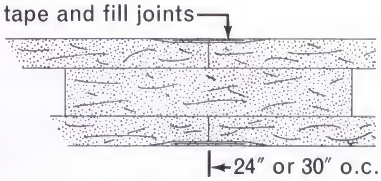
⑰ choice of a, b or c



⑰A **1 Hr.—U of C 8-6-71**

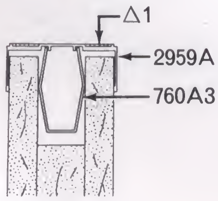


⑰B **1 Hr.—U of C 11-1-66**

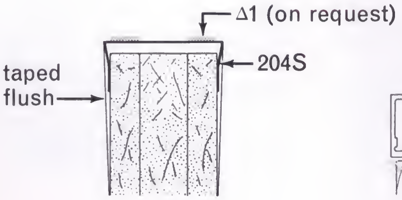


⑰C non-rated

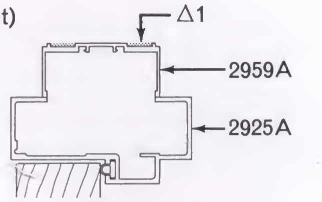
① choice of a or b



①A



①B



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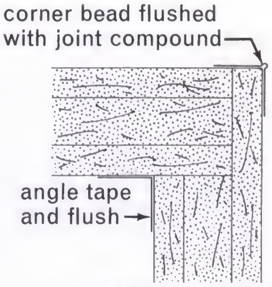
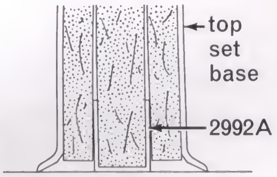


corner intersection



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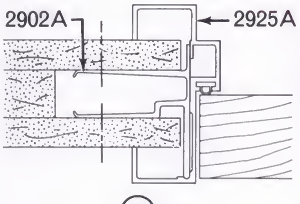
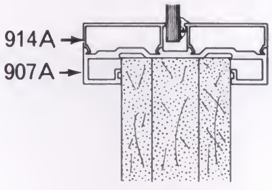


⑨ Δ2



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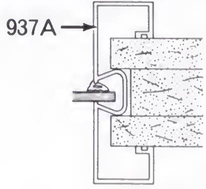


⑫

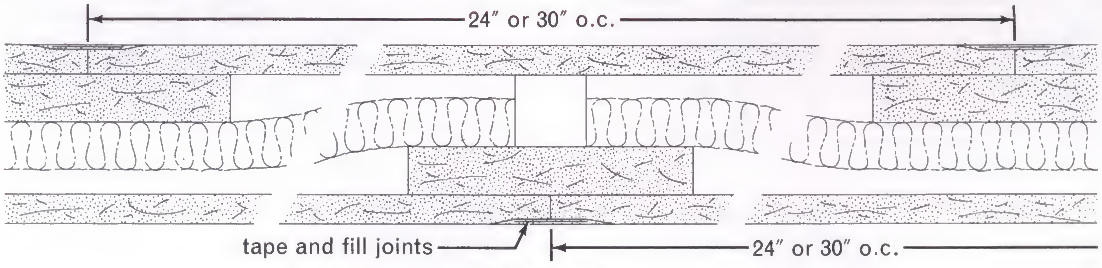
Δ1—⅛″ Polyurethane Gasket

Δ2—30-min. ICBO Approval

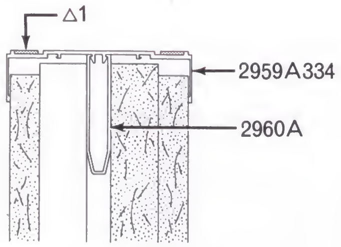
details/3¾″ sound wall (2700 and 2900 series)

scale: 3″ = 1′-0″

Note: extrusions illustrated are for the 2900 series

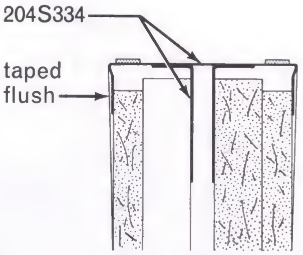


1 Hr.—est.

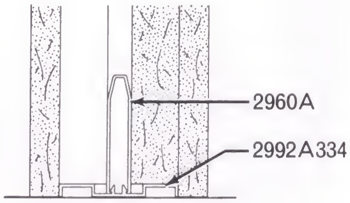


ceiling attachment

Δ1—⅛″ Polyurethane Gasket



ceiling attachment (alternate)



floor attachment

specifications

notes to architect

1. *The standard finish for all VAUGHAN WALLS Aluminum Components is described in Part 2. Exposed aluminum components of any VAUGHAN WALLS Series also are available with baked enamel finish or any of following optional anodized finishes:* (1) V01C1R1 *Clear,* (2) V11C1R1 *Light Bronze,* (3) V12C1R1 *Medium Bronze,* (4) V13C1R1 *Dark Bronze,* (5) V5C1R1 *Black. All anodized finishes are available with or without directional* C1 *polish.*

2. *Most vinyl wall coverings, film or fabric-backed, can be applied to VAUGHAN WALLS Partition Systems either at the factory or on the project site.*

3. *The most expedient way to obtain additional information on fire ratings, sound transmission or details not covered in this publication is to direct inquiries to Vaughan Walls, Inc.,* 11681 *San Vicente Blvd., Los Angeles, Calif.* 90049, *or any Vaughan Walls licensed contractor.*

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.1.1 work included

The partition contractor shall furnish all labor, materials and equipment necessary to complete all VAUGHAN WALLS installations: laminated gypsum panels, aluminum components, glass sections, door frames, floor and ceiling runners. Contractor shall also furnish and install wood doors, wood veneers, vinyl wall covering, glass and glazing as may be required to complete the installation.

1.1.2 work not included

a. Ceilings.
b. Painting.
c. Electrical.
d. Top set base.
e. Finish hardware.

1.2 description of systems

VAUGHAN WALLS Gypsum Partitions shall be:

a. Movable Chase Wall, 2¼″ thick, with (700)(900) Series aluminum components. The assembly shall have a 1-hour fire rating in accordance with U of C 11-1-66 and a sound rating of 37 STC in accordance with WL-73-59160.

b. Movable Sound Wall, 3″ thick, with (700)(900) Series aluminum components. The assembly shall have a 1-hour fire rating in accordance with U of C 8-12-68 and a sound rating of 45 STC in accordance with WEAL-67-131.

c. Movable Low Rail Wall, 2¼″ thick, with aluminum components.

d. Fixed Chase Wall, 2¼″ thick, with (2700)(2900) Series aluminum components. The assembly shall have a 1-hour fire rating in accordance with U of C 8-6-71 and a sound rating of 37 STC in accordance with WL-73-59160.

e. Fixed Sound Wall, 3¾″ thick, with (2700)(2900) Series aluminum components; cellular neoprene isolators and 1″ insulation blankets in the partition cavity. (The 2900 Series assembly shall have a sound rating of 45 STC in accordance with WEAL-72-148).

1.3 qualifications

All Vaughan Walls Partitions, including doors and related wall coverings, shall be installed under a single contract by a Vaughan Walls Licensed Contractor employing specialized craftsmen, skilled in wall construction and custom wall-covering installation, under close supervision of experienced foremen who have received on-the-job training by Vaughan Walls, Inc.

1.4 submittals

Partition contractor shall submit to the architect detail drawings of all metal components showing attachments to adjacent work and to each other in compliance with the preceding General Conditions.

1.5 delivery and storage of materials

All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.6 environmental conditions

Temperatures within the building shall be above a constant minimum of 55°F during lamination and erection of partition panels. When required, heat shall be furnished by (building owner) (general contractor). Erection of partition panels shall not begin until erection of exterior walls and glazing or temporary covering of exterior openings provide complete protection from outside weather.

Part 2: products

2.1 partition panels—assembled to form nominal (24″)(30″) wide modular panels or monolithic surface as specified below:

a. Movable Chase Wall Panels—semi-solid, job-laminated Vaughan Walls 1″ x 6″ nom. Gypsum Coreboard strips spaced (12″) (18″) apart and faced both sides with ⅝″ Vaughan Walls (regular) (Firecode) (24″)(30″) Gypsum Panels.

b. Movable Sound Wall Panels—two rows ⅝″ Vaughan Walls (regular) (Firecode) (24″)(30″) Gypsum Panels laminated to ⅜″ Vaughan Walls Gypsum Coreboard with ½″ x 6″ Gypsum Coreboard strips laminated to backing board at panel joints.

c. Movable Low Rail Panels—⅝″ Vaughan Walls bevel-edge gypsum panels (24″)(30″) factory-or job-laminated to both sides of 1″ x 6″ nom. Gypsum Coreboard strips.

d. Fixed Chase Wall Panels—semi-solid, ⅝″ Vaughan Walls (regular) (Firecode) Gypsum Panels laminated-in-place to both sides of 1″ x 6″ (nom.) Gypsum Coreboard strips.

e. Fixed Sound Wall Panels—two rows ⅝″ Vaughan Walls Gypsum Panels, 30″ wide, laminated and stapled to one side of 1″ x 6″ (nom.) Gypsum Coreboard strips at panel joints.

2.2 adhesive—Vaughan Walls Brand W-300 Non-flammable Adhesive, Vaughan Walls WR 2900 Adhesive or Vaughan Walls Contact Adhesive.

2.3 aluminum components—manufactured to standards approved by Vaughan Walls, Inc.

a. Extrusions—5010 aluminum alloy (or equal) shall be used whenever aluminum components are anodized and exposed. 6063T5 aluminum alloy (or equal) may be substituted on concealed extrusions or when exposed components are to be painted.

b. (Standard) Finishes—mill finish for unexposed components: (V01C1R1 clear with directional texture) (V12C1R1 medium bronze with directional texture) anodized for exposed components of (700)(900)(2700)(2900)(Low Rail) Series except for ceiling runners on (900)(2900) which are velvet black enamel.

c. Door Frames—factory-mortised, reinforced, drilled and tapped for mortised hardware according to templates furnished by hardware supplier. Reinforced for surface-applied hardware as required.

2.4 finishing accessories—reinforcing tape, joint compounds and metal corner beads as manufactured by United States Gypsum Company or equal.

2.5 panel finishes

a. Wood—(⅛″ architectural veneer) (Vaughan Walls Wood Wrap Veneer pre-wrapped on face panels). (Specify type of finish desired.)

b. Vinyl—Vinyl wallcoverings as selected from Vaughan Walls sample books (wrapped on face panels at job site prior to erection) (factory-applied to face panels) (applied as a smooth continuous surface after face panel erection).

c. Other Wallcoverings—(Specify type desired.)

d. Paint—One coat of Sheetrock Sealer, and one coat of Grand Prize Acrylic Latex Paint or one coat of flat oil paint, or equal.

2.6 post insert—Black rigid vinyl (for Low Rail Series).

Part 3: execution

3.1 installation

a. Partitions—Lay out partitions accurately and securely anchor floor and ceiling runners. Such attachment shall assure complete security of the partition and future removal (and relocation of movable and demountable partitions) without excessive damage to the floor or ceiling construction.

b. Gaskets—Install polyurethane gaskets between all ceiling runners and ceiling materials.

c. Partition Panels (700 or 900 Series)—Form and laminate in special jigs to insure a constant dimension at the tongue and groove. Offset coreboard from face panels to form a tongue and groove 1½″ deep. Install panels in floor and ceiling runners to form tight joints with true vertical and horizontal alignment.

d. Partition Panels (2700 or 2900 Series)—Install face panels vertically between floor and ceiling runners. Laminate panels in place to both sides of coreboard strips spaced (24″)(30″) o.c. For sound walls, laminate panels to one side of coreboard strips spaced 30″ o.c. Center face layer joints over strips and stagger joints on opposite partition sides. Fasten face panels to strips with staples spaced 18″ o.c. In sound walls, install 1″ insulation in the cavity butting ends and edges closely together and filling all voids.

e. Partition Panels (Low Rail Series)—Stand four-way posts at intersections. (Attach double-faced tape to aluminum floor runner, hook runner into posts and press securely to tile or hard flooring.) (Hook special aluminum floor runner incorporating carpet "teeth" for (¼″)(½″) carpet, into posts and press securely into carpeting.) Use no mechanical fasteners penetrating finish floor. Hook aluminum channels for partition intersections onto four-way post. Lift panel closest to post into base and slide into channel. Install balance of panels progressively. Install continuous cap over panels and attach with concealed angle clips. At partition terminals, trim ends with mitered section of aluminum cap running to floor. Slide rigid black vinyl inserts into open side of four-way posts and press square caps onto top of posts.

f. Aluminum Door Frames—Assemble frames plumb and square. Fasten 700 Series frames with screws into 1″ x 4″ long dowels set into coreboard. Screw-attach 2700, 900 and 2900 Series frames through the panels. Anchor bottom of frames to floor runner.

g. Extrusions—Use maximum length sections and install splice plates and angles as detailed to reinforce all connections. Cut ends and miters accurately and clean to fit adjacent parts neatly.

h. Joint Compound—Apply to beveled joints of panels, to insure proper bridging or paint. Wipe excess cement from joint, leaving a true "V" bevel.

i. Metal Corner Bead—Install at all external corners, where aluminum extrusions are not installed. Apply at least two coats of joint compound over beads and feather each coat out onto panel face.

j. Tape and Joint Compound—Apply according to manufacturer's directions to all internal corners and intersections where flush finishing is desired or metal trim is not specified.

k. Electrical Outlets—Position outlets as detailed; coordinate with the electrician.

l. Finishes—Apply wood veneer and vinyl wallcovering using adhesive approved by Vaughan Walls, Inc. Apply paint according to manufacturer's directions.

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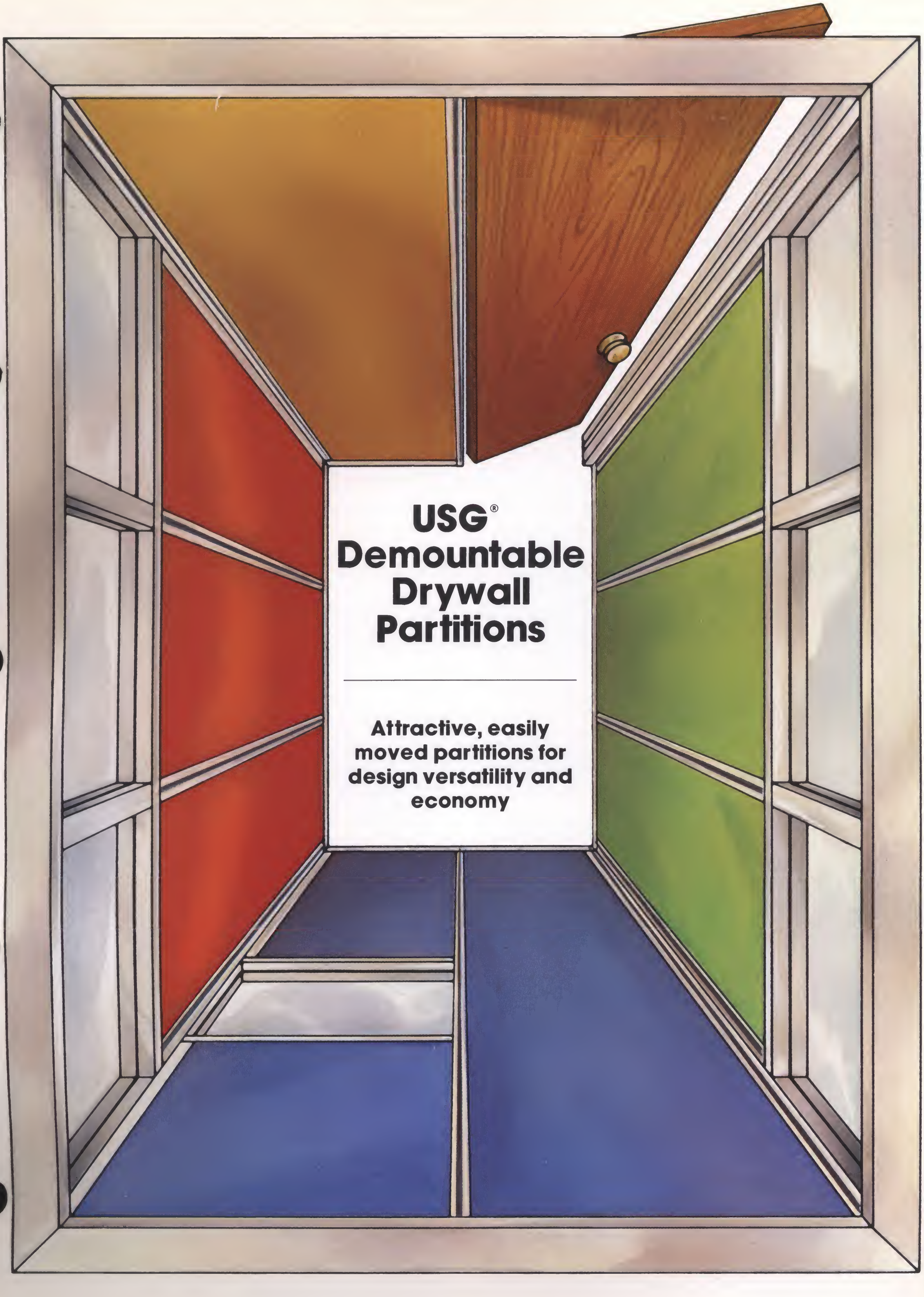
NOTE: All products described here may not be available in all geographic markets. Consult Vaughan Walls, Inc. for further information.

Vaughan Walls 11681 San Vicente Blvd., Los Angeles, Calif. 90049

UNITED STATES GYPSUM 101 South Wacker Drive, Chicago, Illinois 60606
BUILDING AMERICA

SA-1040/USG/1-77 Printed in U.S.A.



USG® Demountable Drywall Partitions

Attractive, easily moved partitions for design versatility and economy

Rapid Installation, Ready Mobility

USG Demountable Drywall Partitions offer a total-engineered system with matching components for design freedom and movability. Installation is similar to standard drywall construction and is handled by regular partition contractors. Framing is with USG Steel Studs and Runners, facings are attractive, durable TEXTONE® Vinyl-Faced Panels or plain SHEETROCK® Gypsum Panels, decorated on the job. Your U.S.G. salesman or partition contractor can show you samples of the wide choice of TEXTONE Panel decorator colors and textures — woodgrains, fabrics, solids. Joints between panels are concealed with attractive battens — no taping or finishing is required. Glazing components are available for most situations, trim is of satin-anodized aluminum and includes matching posts, mullions, post caps and a specially designed picture moulding. This versatile system offers a 1-hr. fire rating and a sound-attenuation rating up to 49 STC.

Space changes in today's buildings average up to 20% a year. With these low-cost, fully engineered partitions in ceiling, cornice or bank-rail heights, you can plan for such changes — beautifully!

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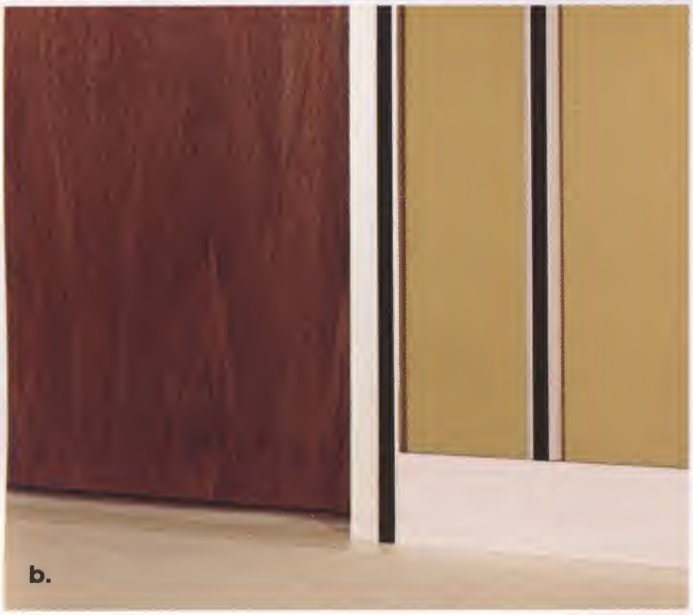
Adaptability

a.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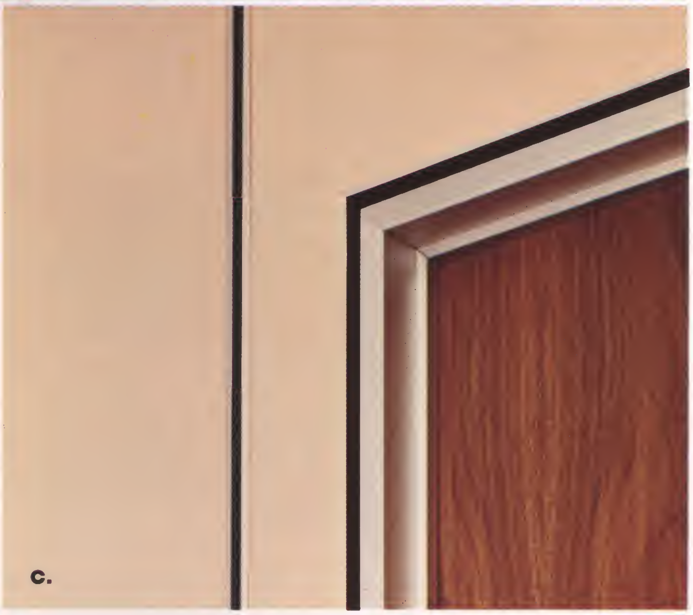
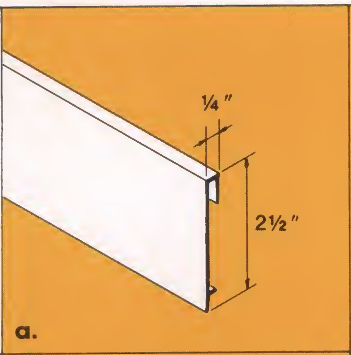

c.

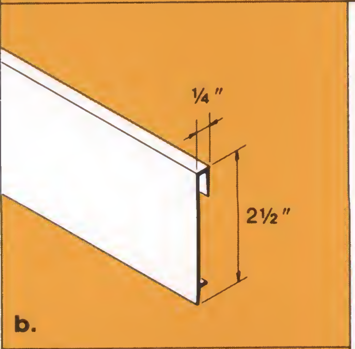
a. The USG Demountable Drywall Partition in this attractive office can be disassembled and relocated in a matter of hours. All components are readily available and are virtually 100% reusable. Wide availability of contractor and labor services assures prompt, efficient installation.

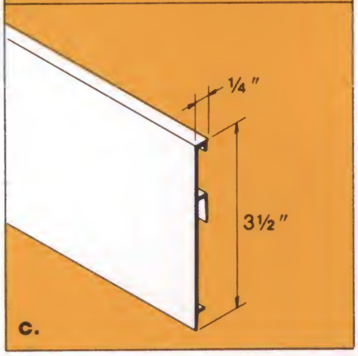
b. Aluminum base snaps into place on clips attached to conventional USG Steel Runner. Available either 2-1/2 in. or 3-1/2 in. high. Base is complemented by matching drive-in ceiling trim. Batten can be used with accent-black or neutral gray vinyl insert. Screwheads in door frame are concealed by same means.

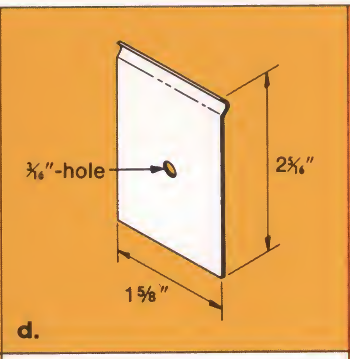
c. Three-piece door frame, with no exposed fasteners, features concealed hinge attachment. Here, black insert contrasts boldly with the door.

Components – USG Demountable Drywall Partitions









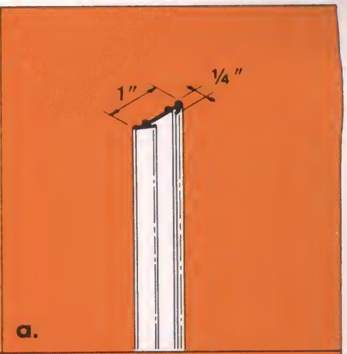
base items

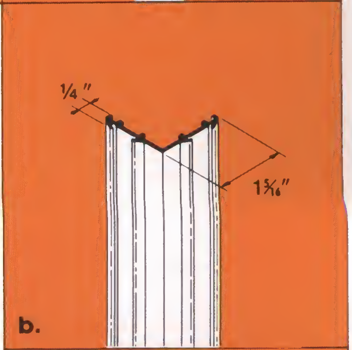
a. ABS-101 – 2-1/2-in. Snap-on Aluminum Base – a clean-lined finished exposed base which snaps onto SBS-153 base clip. In 12-ft. lengths.

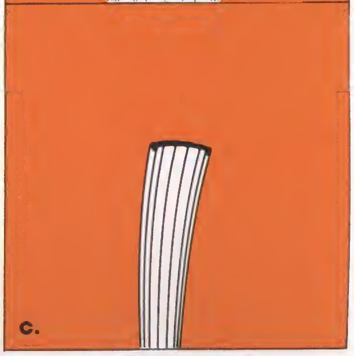
b. VBS-123 – 2-1/2-in. Snap-on Vinyl Base – a finished black vinyl base similar to ABS-101 base. In 12-ft. lengths.

c. ABS-137 – 3-1/2-in. Snap-on Aluminum Base – a finished base like ABS-101 except providing 1 in. additional height. In 12-ft. lengths.

d. SBS-153 – Base Clip – retainer for ABS-101, VBS-123 and ABS-137 bases. Fastened through gypsum panels into stud with 1-1/4-in. Type S Screws.





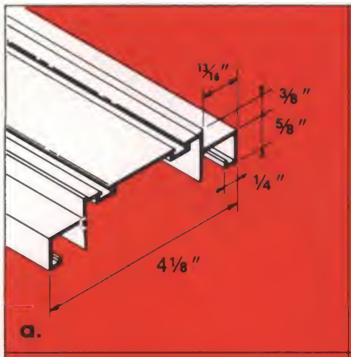


battens

a. ABT-104 – Batten – used to conceal panel joints. Attaches with 1-1/4-in. Type S Screws through pre-punched holes. VBT-105 batten insert conceals screwheads. Also may be used as an interior corner. In 8-, 9-, 10- and 12-ft. lengths.

b. ABT-103 – Exterior Corner – reinforces and conceals corners. Attached with 1-1/4-in. Type S Screws through pre-punched holes. VBT-105 batten insert conceals screwheads. In 8-, 9-, 10- and 12-ft. lengths.

c. VBT-105 – Batten insert – creates accent line while concealing screwheads in ABT-104 batten, ABT-103 exterior corner, ARL-145 picture moulding and ADF-175 door frame. In 2000-ft. rolls, gray or black.



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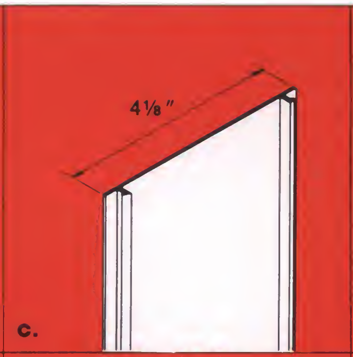

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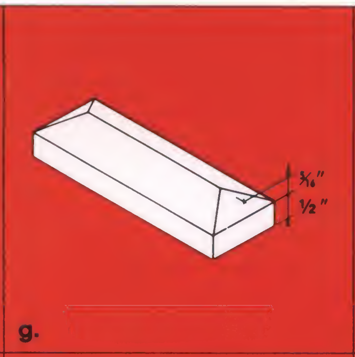

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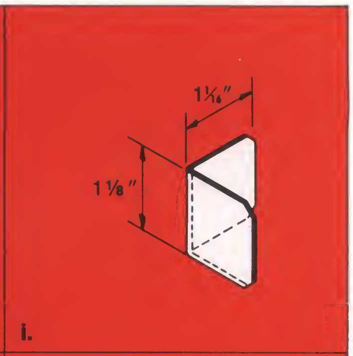

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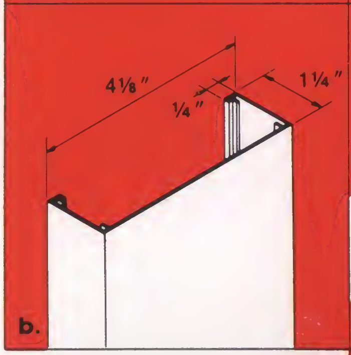

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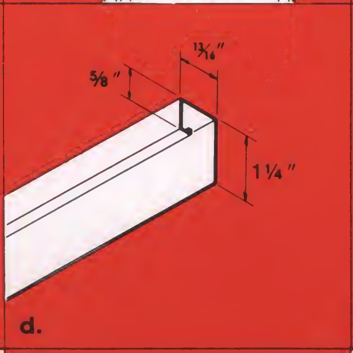

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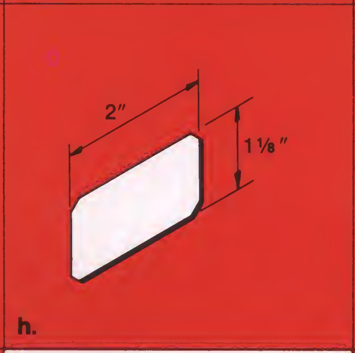

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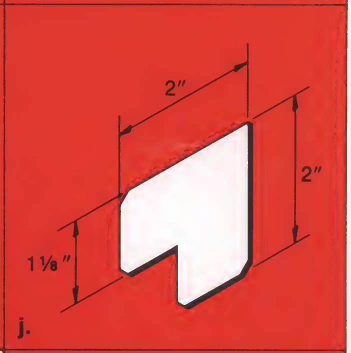


j.

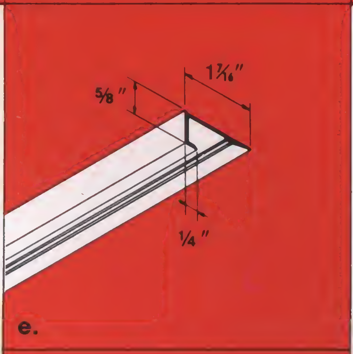
rail and trim items

a. ARL-122—Recessed Ceiling Runner & Trim—one-piece combination ceiling runner and finished trim. Anchored to ceiling with fasteners suitable to ceiling construction. Gypsum panels are inserted into flanged opening. In 15-ft. lengths.

b. ARL-106—Rail—used as a bank-rail cap, glazed or unglazed cornice cap, and as partition terminal. Attached with adhesive or 1-1/4-in. Type S Bugle Head Screws (cadmium-plated). In 15-ft. lengths.

c. ARL-170—Rail Cover—a plain, snap-in closure for ARL-106 and AGL-156 rails. Used to close unglazed posts above rail and cornice height. In 15-ft. lengths.

d. ARL-102—Ceiling Trim—a finished trim, attached with USG Metal Lock Fastener tool to 2-1/2-in. USG Steel Runner having 1-1/4-in. flanges, prior to positioning the gypsum panels. In 12-ft. lengths.



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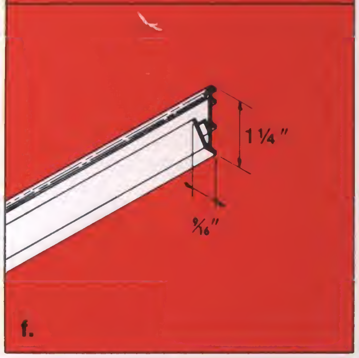


f.

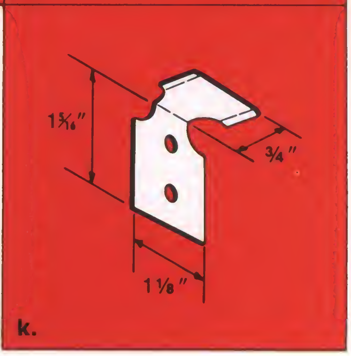
e. ARL-146—Drive-in Trim—a finished ceiling trim which is positioned over top edge of gypsum panels and driven into place. In 12-ft. lengths.

f. ARL-145—Picture Moulding—can be used as combination ceiling trim and picture moulding on ceiling-height partitions, or as picture moulding at appropriate heights. Attached with 1-1/4-in. Type S Screws. VBT-105 batten insert conceals screwheads. In 15-ft. lengths.

g. VRL-107—Rail Cap—black vinyl cap to fit over end of ARL-106 rail when used as terminal post on bank rail partitions. Attached with Sears Vinyl Household Adhesive, General Electric Silicone Rubber Adhesive RTV-102 or equal.

h. SRL-111—Splice Clip (butt joints)—14-ga. metal splice provides friction-fit joining of lengths of ARL-106 or AGL-156 rails, allowing accurate alignment and tight joints. Two required per joint.

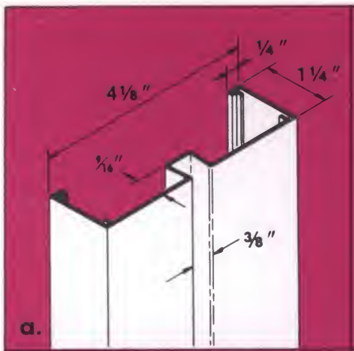
i. SRL-121—Splice Clip (horizontal miter)—14-ga. metal splice provides friction-fit joining of mitered, horizontal ARL-106 or AGL-156 rails, allowing accurate alignment and tight joinery. Two per joint required.

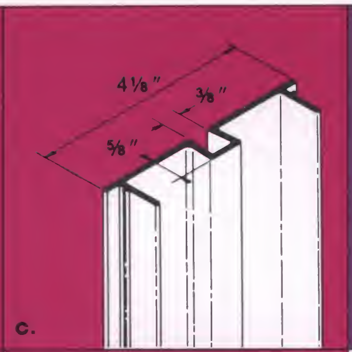


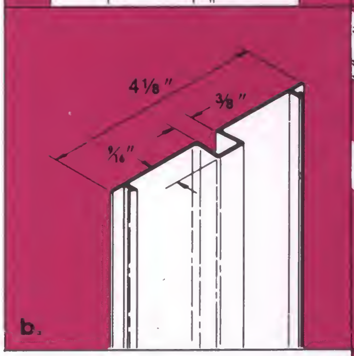
k.

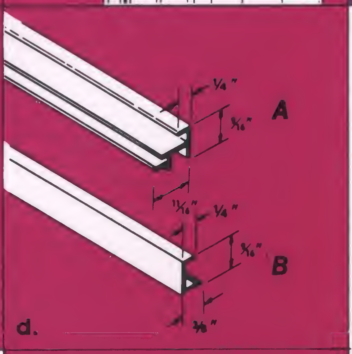
j. SRL-134—Splice Clip (horizontal-to-vertical miter)—14-ga. metal splice provides friction-fit joining of mitered, horizontal-to-vertical ARL-106 or AGL-156 rails, allowing accurate alignment and tight joinery. Two per joint required.

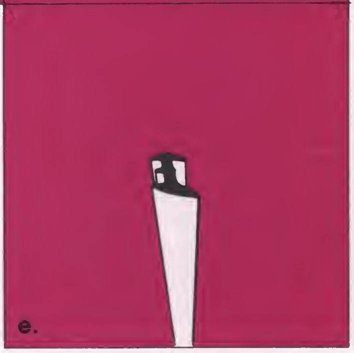
k. SRL-108—Rail Clip—to attach mullions and cornice cap in glazed cornice partitions. Secured to ceiling rail and cornice cap with 3/8-in. Type S-12 Screws, to ARL-106 or AGL-156 mullion rails by friction-fit. Four required per mullion.











glazing components

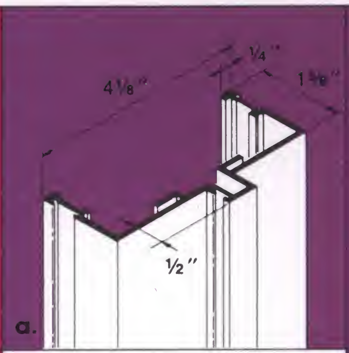
a. AGL-156 — Glazing Rail — used as intermediate mullion component, finished head and jamb for glazed openings. VGL-110 glazing spline secures glass. In 15-ft. lengths.

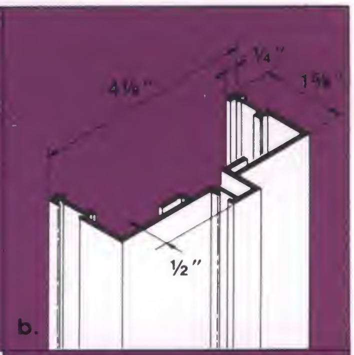
b. AGL-168 — Glazing Rail Cover — a snap-in glazing closure for ARL-122, AGL-156 or ARL-106 rails. VGL-110 glazing spline secures glass. In 15-ft. lengths.

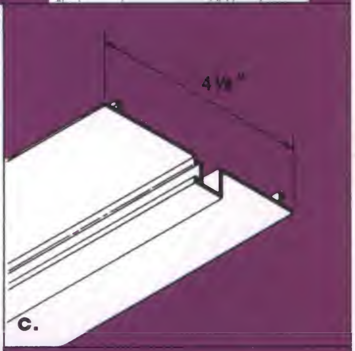
c. AGL-152 — Door Frame Glazing Cover — a snap-in closure for ADF series door frames where high panels of glass occur adjacent to door. Secured with 1-in. Type S-12 Screws on each side. VGL-110 glazing spline secures glass. In 10-ft. lengths.

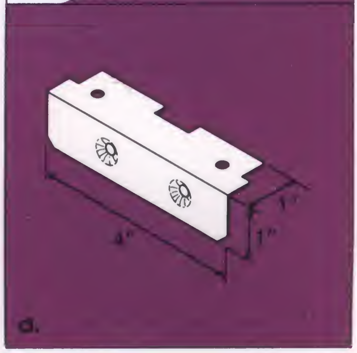
d. AGL-126 — Glass Stop A and AGL-127 Glass Stop B — a two-piece, snap-together, horizontal glass stop used at sill with ARL-106 rail or ARL-170 rail cover. VGL-110 spline secures glass. In 12-ft. lengths.

e. VGL-110 — Glazing Spline — installed on private side of partition for glazing 7/32-in. or 1/4-in. plate glass. Available in black.









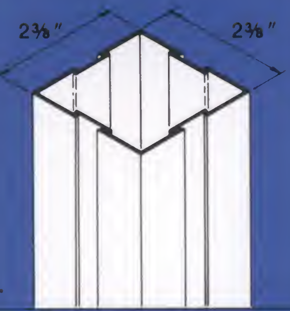
door frames

a. ADF-175 — Three-piece Door Frame — complete frame with mitered joints. Three regular 4-1/2-in. by 4-in. hinges, standard 2-3/4-in. by 1-1/8-in. strike and dust box and integral mute factory-installed. For 1-3/4-in. solid or hollow-core doors. Attaches with 1-1/4-in. Type S Screws. VBT-105 batten insert conceals screwheads. Ball-bearing hinges available if door closer required. In 3 ft. by 6 ft. — 8 in. and 3 ft. by 7 ft. dimensions, right- and left-hand opening.

b. ADF-180 — Door Frame — a two-piece frame for ceiling-height openings. Ends are cut square. Hardware is provided as with ADF-175 frame. Three hinges are located for 7-ft. door with transom. Head is completed with ADF-131 door stop. In 10-ft. heights, right- and left-hand opening.

c. ADF-131 — Snap-in Door Header — snaps into ARL-106 rail or ARL-122 ceiling runner to provide head for ceiling or cornice-height door frame openings. Notched to fit ADF-180 frames. Available for 3 ft. — 0-in. openings.

d. ADF-109 — Jamb Clip — used to secure jambs to head on ADF-180 door frames with adjacent, full-height glazing. Attached with 3/8-in. Type S-12 Screws.



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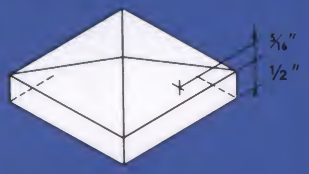

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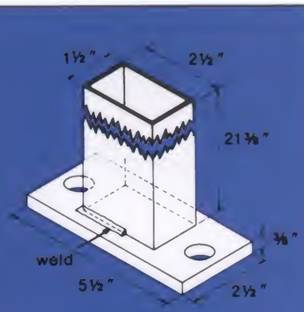
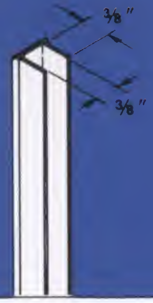


g.

Note:
For architectural details and specifications, see U.S.G. Folder SA-1030. For installation directions, see Demountable Partition Systems Installation Manual WB-1288.



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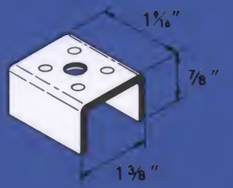

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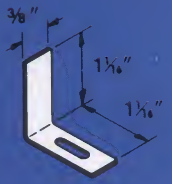

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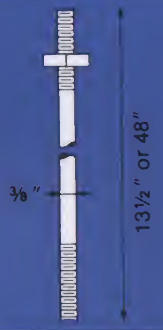

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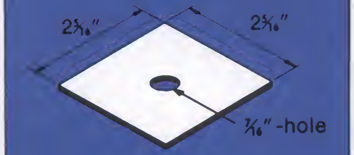


f.

post items

a. APT-173—Post—glazing post for bank-rail partitions, and corner post and mullion for glazed sections in cornice- and ceiling-height partitions. Secured with SPT-136 post assembly or where glazing extends to ceiling, SPT-130 post clip. Accepts APT-112 post channel. VBT-105 batten insert is optional for unglazed sides. In 10-ft. lengths.

b. APT-112—Post Channel—a glazing channel which inserts into sides of APT-173. Requires VGL-110 glazing spline. In 10-ft. lengths.

c. VPT-128—Post Cap—a black vinyl cap to fit over end of APT-173 post on bank-rail partitions. Attached with Sears Vinyl Household Adhesive, General Electric Silicone Rubber Adhesive, RVT-102 or equal.

d. SPT-113—Post Assembly Channel—receives SPT-136 post assembly for attaching APT-173 post to ARL-106 rail on bank-rail partitions. Permits 1/2-in. horizontal adjustment of post. Attached with 1-1/4-in. Type S-12 Screws.

e. SPT-136—Post Assembly—3/8-in. threaded rod and jamb nut for post attachment. Available 13-1/2-in. long, for attaching glazing posts to bank-rail partitions (accommodates 13-in.-high glass) and 48-in. for attaching corner posts and intermediate mullions in glazed cornice and ceiling-height partitions. Threads into SPT-113.

f. SPT-171—Post Plate—used with SPT-136 assembly for attaching APT-173 posts to bank-rail partitions.

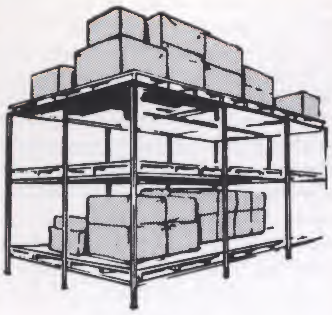
g. SPT-119—Rail Strut—a support for bank-rail partitions where ends are free-standing or where partition exceeds horizontal span limitations. Spaced 8 ft. o.c. and within 6 in. of terminal ends. Attached to floor with two anchors. 2-1/2-in. USG Steel Studs are attached to strut with suitable bolts.

h. SPT-130—Post Clip—attaches SPT-173 post to AGL-156 rail at head and ARL-106 rail cap at sill in glazing sections where glass extends from rail or cornice height to ceiling. Fastened to rails with 3/8-in. Type S-12 Screws.

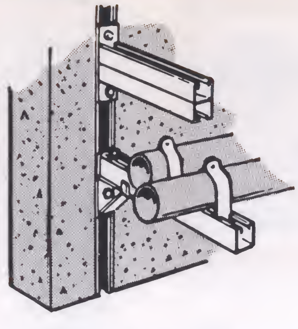
UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

MP-435/USG/rev. 9-77

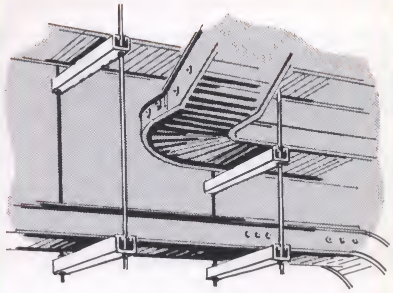
GLOBE-STRUT® Channel Framing



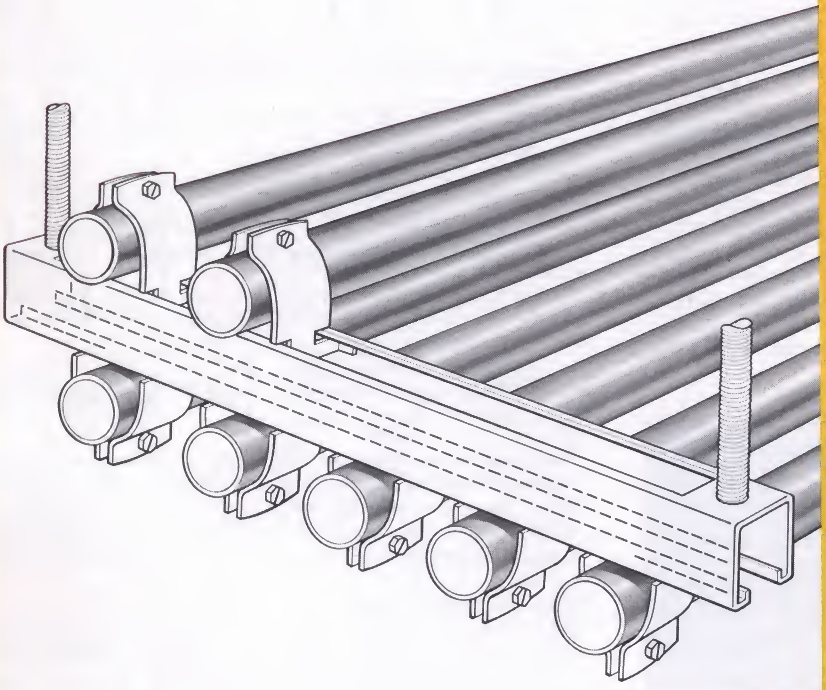
Racks



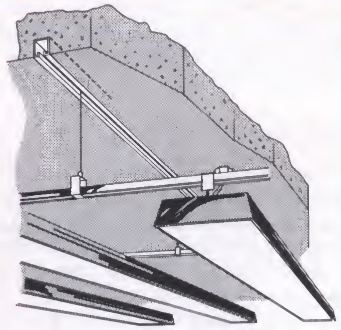
Concrete Inserts



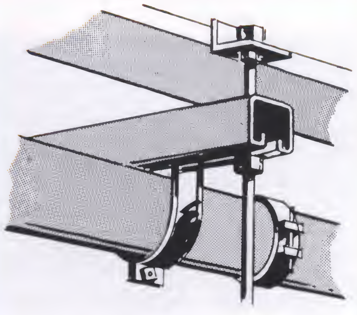
Cable Tray Supports



Double-slotted Channel



Electrical Supports



Mechanical Supports

description and utility

Globe-Strut Channel Framing satisfies a broad range of needs for a bolted framing system for mechanical, electrical and industrial applications. Designed and manufactured to exacting U.S.G. standards, it simplifies and reduces cost of structural fabrication and makes possible in-plant construction of structural frames for machinery, racks and pipes. Channel framing also offers a combination accessible surface raceway and support for lighting fixtures and electrical equipment.

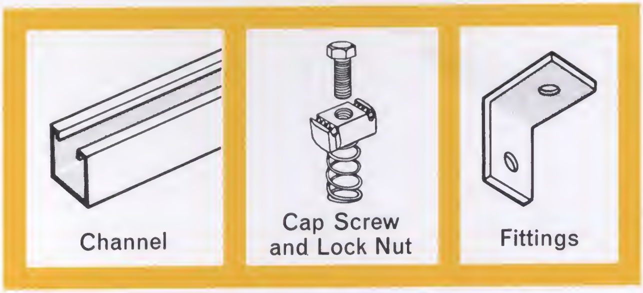
When embedded in monolithic concrete, this economical framing provides a convenient flush mounting in walls, ceilings and floors. Roll-formed steel channels and hundreds of fittings and accessories are available to provide these features:

Fast Installation—this system of metal framing is so simple, a hacksaw and wrench are the only tools required. What takes hours with welded framing often assembles in minutes with the Globe-Strut System.

Positive Connections—the key element in the system is the electro-galvanized "triple grip" Globe-Strut Lock Nut. Its unique curved ends permit positioning inside the channel without tools. Triple-grip holding power derives from the built-on spring that holds the nut firmly against the inside of the channel lips, grooves that embrace the lips to prevent turning, serrations within the grooves that prevent slippage.

Versatile—the number and combination of installations possible with this system are almost limitless. Best of all, when Globe-Strut has served its purpose in one capacity, it can be easily dismantled and reassembled for another use.

Permanent Finish—the galvanized finish literally becomes part of the metal—resists separation when crimped or subjected to impacts, stresses or pressures. Globe-Strut serves indoors or out, year after year. (Optional finishes available.)



types and functions

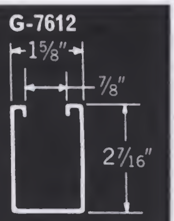
Globe-Strut Channel Framing is available in either the basic solid continuous type or in six variations—combination, slotted, slotted-hole, double-slotted, knock-out, punch-out and concrete inserts—to meet specific uses. A specially designed lock nut and cap screw is used with appropriate fittings to assemble channels in any position or in any combination with other channel types.

Channel Framing

Basic Channels with a solid continuous web are used for general framing requirements. They are available in eight different sizes (see details below), cold-formed from mild steel to meet light, medium and heavy load requirements. Standard lengths: 10 and 20 ft. (except G-1619 and G-3219, 10 ft. only). Also available in G-5812-AL, extruded from aluminum alloy 6063-T6, 20-ft. length only. Finishes available: hot-dipped mill galvanized meeting ASTM A525; hot-dipped galvanized after fabrication meeting ASTM A153; painted with Globe Green or Globe Gray Lacquer, or Globe Red Chromate meeting Fed. Spec. TTP-636C; plain, with no coating except preservative oil.

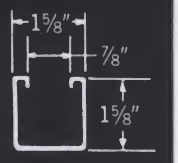
steel

G-7612



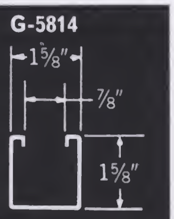
12-ga.
2.40 lbs./lin. ft.

G-5812



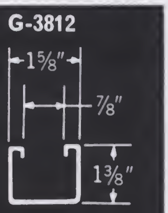
12-ga.
1.85 lbs./lin. ft.

G-5814



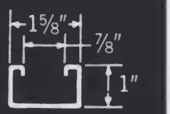
14-ga.
1.42 lbs/lin. ft.

G-3812



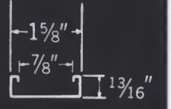
12-ga.
1.67 lbs./lin. ft.

G-1012



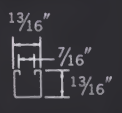
12-ga.
1.41 lbs./lin. ft.

G-1315



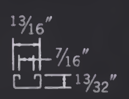
15-ga.
0.92 lbs./lin. ft.

G-1619



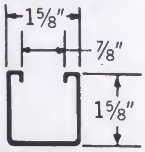
19-ga.
39-lbs./100 ft.

G-3219



19-ga.
27-lbs./100 ft.

aluminum
G-5812-AL

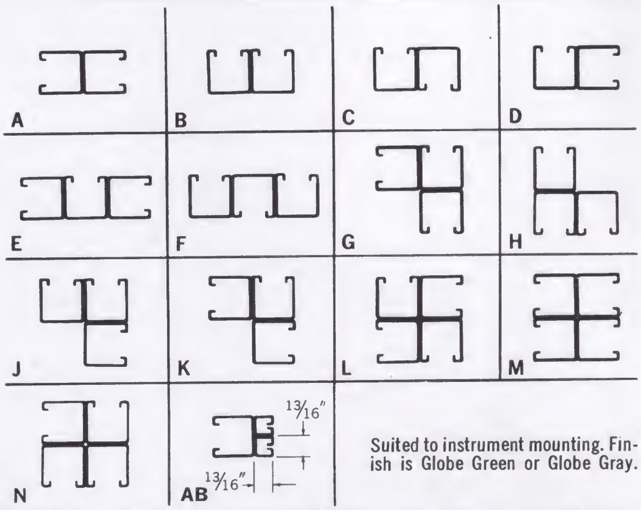


.070″ thick
0.60 lbs./lin. ft.

Combination Channels consist of two or more basic channels spot-welded back-to-back or side-to-side at the factory for use when extra load-carrying capacity is required. They are also used to provide additional slot openings simply and efficiently. To specify type of section required, add letter to channel designation, i.e., G-5812-A, G-7612-C, etc.

available combinations of components

shape	A	B	C	D	E	F	G	H	J	K	L	M	N	AB
G-7612	x	x	x					x				x		x
G-5812	x	x	x	x	x	x	x	x	x	x	x	x	x	x
G-5814	x	x	x	x	x	x	x	x	x	x	x	x	x	x
G-3812	x	x	x					x				x		x
G-1012	x													x
G-1315	x													x
G-1619	x													x
G-3219	x													



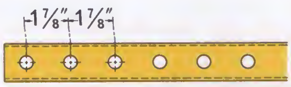
Suited to instrument mounting. Finish is Globe Green or Globe Gray.

Punch-out Channels have 9/16″ dia. holes spaced 1⅞″ o.c. starting 13/16″ from end. Pre-punched holes offer added flexibility for attaching channels and fixtures. To specify, add suffix "PO" to product number. (G-7612, G-1619 and G-3219 excluded.) Lengths: 9′11¾″ and 19′11¾″; tolerance +⅞″, -0″.

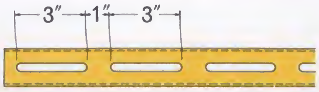
Slotted Channels have 13/32″x3″ slots spaced 4″ o.c. starting 1⅞″ from end. Ideal support for pipe, tube, conduit and cable tray. To specify, add suffix "SL" to product number. (G-7612, G-1619 and G-3219 excluded.) Standard lengths: 9′11¾″ and 19′11¾″; tolerance +⅞″, -0″.

Slotted-hole Channels have 9/16″ dia. x ⅞″ slotted holes spaced 2″ o.c. starting 1″ from end. Slotted holes allow minor bolt adjustment, match spacing on many fittings. To specify, add suffix "SH" to product number. (G-7612, G-1619 and G-3219 excluded.) Length: 19′11¾″; tolerance +⅞″, -0″.

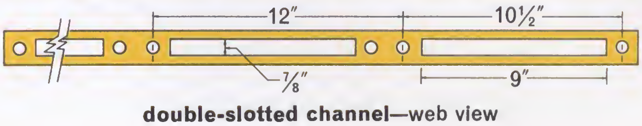
Double-slotted Channels made from G-5812 channel, have ⅞″x9″ slots plus two 9/16″ round holes per 12″-length. Double slots permit positioning pipe, tube and conduit above and below support. Specify G-5812-DS. Standard length: 10′0 1/16″ and in 1-ft. increments up to 10 ft.; tolerance +¼″, -0″.



punch-out—web view



slotted channel—web view



double-slotted channel—web view

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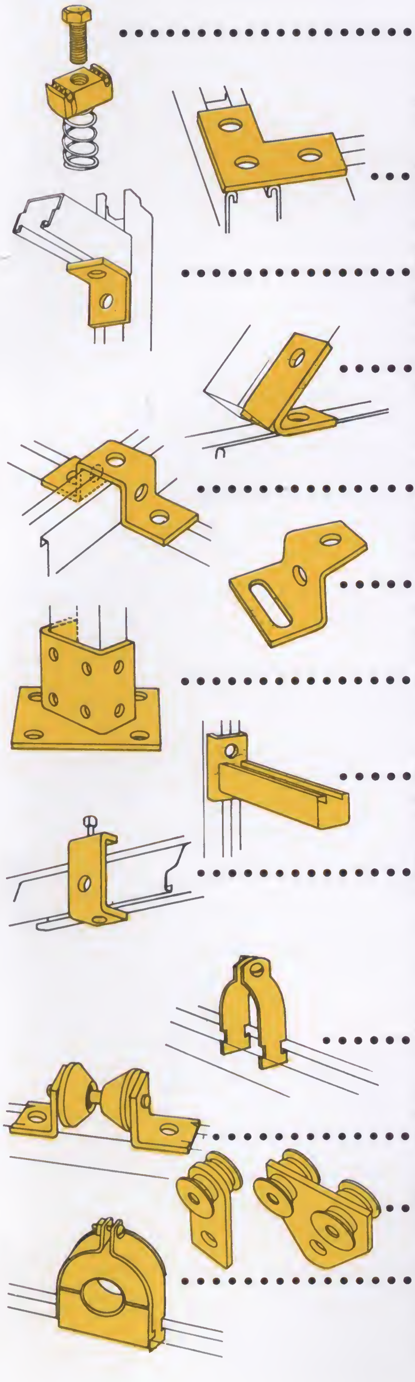
Fittings

Hundreds of fittings, brackets, clamps and fasteners are available to meet various framing needs. They serve multiple functions and eliminate the need for special parts. Fittings are designed for channels with ⅞″-wide slot and are interchangeable with many other brands. They are made of ¼″x1⅝″ hot-rolled steel, pickled and oiled with 9⁄16″ dia. holes, 13⁄16″ from ends and 1⅞″ o.c., unless otherwise specified. Selected flat plate and 90° angle fittings, screws and lock nuts are available for G-1619 and G-3219 channels with 13⁄16″-wide slot. These fittings are made of ⅛″x13⁄16″ hot-rolled steel, pickled and oiled with 9⁄32″ dia. holes, 13⁄32″ from ends and 1 1⁄16″ o.c. Standard finish: electro-galvanized after fabrication. Basic fittings are described below; consult Globe-Strut Channel Framing literature for specific details, sizes and lengths.



Hardware—lock stud, coupling, universal lock nuts, standard bolts, screws, set screws, nuts, flat washers, lock washers.

Flat Plate Fittings—channel washers, splices, tees, angles, gussets, swivel plates.

90° Angle Fittings—standard, adjustable, webbed corner angles; bent tees; shelf gussets.

Bent-Strap Angle Connectors—closed and open types, adjustable to full quadrant range.

U-Shaped Fittings—standard and webbed front, one-side and two-side connectors.

Z-Shaped Fittings—channel supports, adjustable anchors, furring spacers.

Post Bases—short and tall single- and double-column bases, center bolt bases.

Brackets—stair, shelf and channel brackets; braces; pipe-axle supports.

Beam Clamps—many types for channel attachment to beam flange, clamps for fixed or swivel hanger rods for 3,400-lb. loads.

Pipe Clamps—for thin-wall conduit, for heavy-wall conduit and pipe to 8″ o.d.

Pipe Rollers—60° roller, axle type, adjustable.

Trolleys—single and double trolleys with needle bearings.

Cable Clamps—porcelain and maple cable clamps and saddles, maple bus bar clamps.

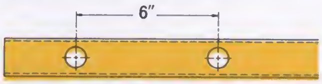
Electrical Raceway and Fittings

Globe-Strut Surface Metal Raceway provides a versatile accessible interior distribution system, for electrical equipment and communication services. When used with lighting, it serves as an economical combination support and raceway for fluorescent fixtures.

Standard or Knock-out Channels are used with Channel Closure Strips, fittings and accessories. Globe-Strut Channels (except G-7612, G-1619 and G-3219) are listed in Underwriters Laboratories Inc. Construction Materials List, Surface Metal Raceway (360 A19) Section. Labeled products available when required.

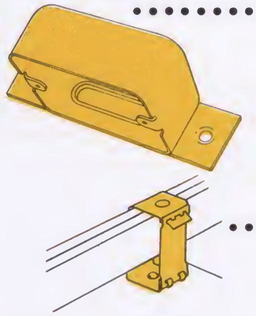
Knock-out Channels have ⅞″ dia. knock-outs 6″ o.c. starting 3″ from the end. To specify, add suffix "KO" to product number. (G-7612, G-1619 and G-3219 excluded.) Standard lengths 10′0 1⁄16″ and 20′0⅜″; tolerance +¼″, -0″.

Channel Closure Strips convert channel for raceway applications: G-5800, cold-formed from 20-ga. galvanized steel; G-5800-AL extruded from 6063-T6 alloy aluminum; .010″ thick. Standard length: 10′0″.



knock-out channel—web view

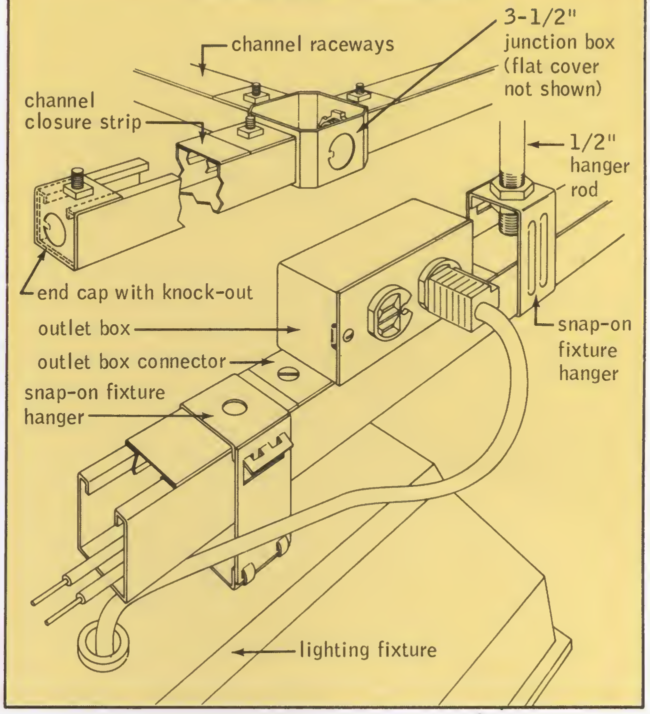
channel closure strip



Raceway Fittings—end cap, plain or with knock-outs; splice plate; aluminum nipple and lock nut; outlet box connector; receptacle box; 1-, 2-, 3-, 4-way junction boxes.

Fluorescent Fixture Fittings—fixture and channel hangers, fixture and hanger fasteners.

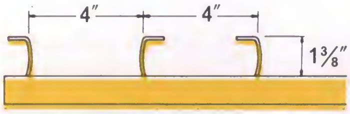
Surface Metal Raceways



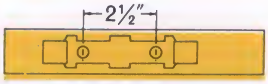
Concrete Inserts

Continuous Concrete Inserts, attached to the pouring face of forms, provide a permanent, continuous mounting slot flush with the concrete surface. A punched portion of the channel web provides protruding "ears" for wire-tying reinforcing bars and mechanical anchorage in the concrete. A plate fills the void created by the "ear" opening to keep concrete from seeping into the channel. Two 3⁄16″ knock-outs in the plate permit nailing to the forms. Inserts are furnished either ready-to-use, with end caps and closure tape installed, or with caps and tape separately for field-cut lengths. Tape is easily removed after forms are stripped. The continuous slot, flush with the surface, is then available—in ceilings for hanger rods, in walls or tunnels for racks to carry piping or electrical equipment, and in floors for anchorage.

CI-5814 Series Concrete Inserts are made from G-5814 Channel; CI-5812 from G-5812; CI-3812 from G-3812; CI-1315 from G-1315; CI-1012 from G-1012 (see page 2, for basic sizes). Lengths: 20′, 18′, 16′, 14′, 12′, 10′, 8′, 6′8″, 6′, 4′, 40″, 32″, 24″, 16″, 12″, and 8″.

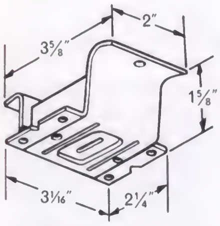


concrete insert—side view

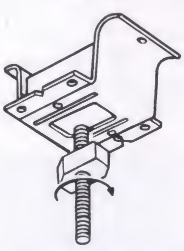


concrete insert—top view

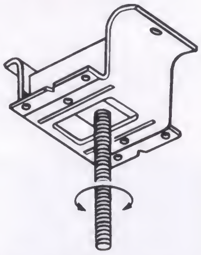
Concrete Spot Inserts, CSI, also available where continuous inserts not required. Easily removed slotted knock-out allows insertion of square or rectangular nuts for threaded rod.



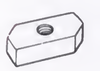
remove knockout



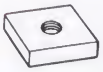
set nut and rod



adjust rod for depth



Rectangular Nuts—CRN series—Inserted into spot inserts on the end of a threaded rod. A simple twist after insertion turns nut crossways, securing it until rod end is turned against roof of insert.



Square Nuts—CSN series—Will not turn in concrete spot insert, permitting rod to be tightened without holding the nut.

specifications

channel framing

All channel framing shall be GLOBE-STRUT, as manufactured by the Metal Products Division of United States Gypsum Company.

The GLOBE-STRUT straight sections shall be cold roll-formed from mild steel or extruded aluminum. The finish shall be (hot-dip mill-galvanized in accordance with ASTM Designation A525) (hot-dip galvanized after fabrication in accordance with ASTM Designation A153) (painted with Globe Green, Globe Gray Lacquer, or Globe Red Chromate after a thorough cleaning and coating with phosphate crystals to assure paint bond) (plain, without any coating except preservative oil).

The size of the straight sections shall be as follows:

designation	cross section	length	gauge
G-7612	2⁷⁄₁₆″x1⅝″	10′0¹⁄₁₆″ and 20′0⅜″	#12
G-5812	1⅝″x1⅝″	10′0¹⁄₁₆″ and 20′0⅜″	#12
G-5814	1⅝″x1⅝″	10′0¹⁄₁₆″ and 20′0⅜″	#14
G-3812	1⅜″x1⅝″	10′0¹⁄₁₆″ and 20′0⅜″	#12
G-1012	1″x1⅝″	10′0¹⁄₁₆″ and 20′0⅜″	#12
G-1315	¹³⁄₁₆″x1⅝″	10′0¹⁄₁₆″ and 20′0⅜″	#15
G-1619	¹³⁄₁₆″x¹³⁄₁₆″	10′0¹⁄₁₆″	#19
G-3219	¹³⁄₃₂″x¹³⁄₁₆″	10′0¹⁄₁₆″	#19
G-5812-AL	1⅝″x1⅝″	20′ only, extruded from 6063-T6	—

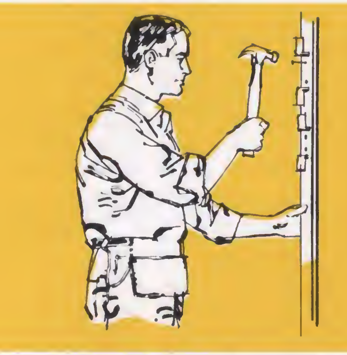
The tolerance on all lengths shall be +¼″—0″

Fittings shall be GLOBE-STRUT fittings and shall be as described in the GLOBE-STRUT Catalog or the latest improvements in the GLOBE-STRUT line. The finish shall be (electro-galvanized) (hot dip mill-galvanized in accordance with ASTM Designation A525) (painted) (plain, without any coating except preservation oil).

Lock nuts shall be GLOBE-STRUT lock nuts, manufactured of hot-rolled steel and electro-plated with zinc. They shall be furnished (with) (without) springs.

Bolts shall be GLOBE-STRUT (Hex-Head Cap Screws) (Flat Head Machine Screws) (Round Head Machine Screws). The finish shall be electro-plated with zinc.

GLOBE-STRUT Channel Framing is available through distributors in principal cities. Consult your U.S.G. Division representative for information, or write directly to: Metal Products Division, United States Gypsum Company, 101 So. Wacker Dr., Chicago, Ill. 60606.



nail insert to pouring face of form

wire-tie reinforcing to "ears"

remove tape after forms stripped

product folder

GLOBETRAY® Cable Trays

SA
1610

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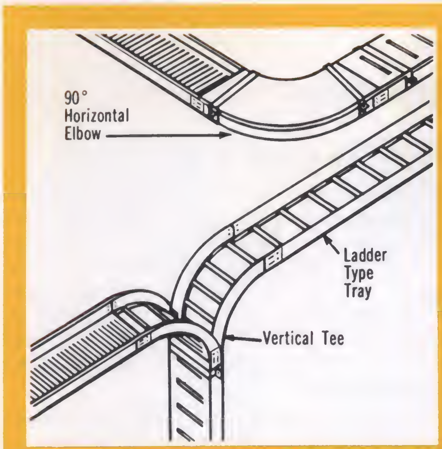
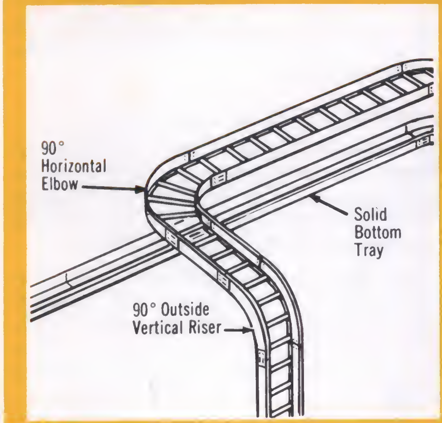
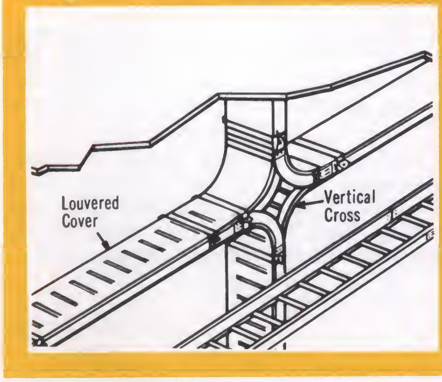
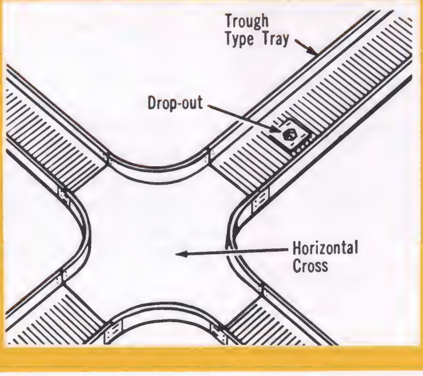
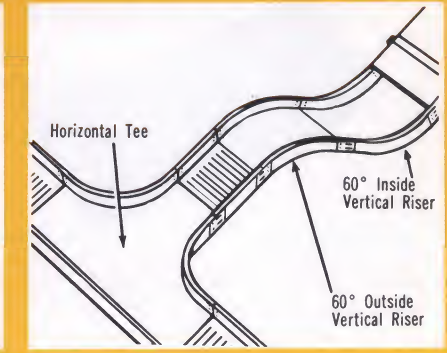










UNITED STATES GYPSUM
1977—1

16 P ELECTRICAL SUPPORT DEVICES
cable tray system

description and utility

Globetray Cable Tray Systems, available in three interchangeable types, are continuous mechanical support systems designed for installation of control, power and signal conductors and other electrical services. Also suitable as a raceway for metal-clad cable and conductors in EMT or rigid conduit. Trays are made in straight sections, with matching fittings to accommodate all changes of direction or quantity of cables. System components are corrosion-resistant, being made from either heavy-gauge steel with galvanized finish or durable aluminum alloy. Design conforms to NEC requirements and NEMA Standards.

These cable trays will also support metal, glass and plastic pipes used in chemical processing, hydraulic lines, and various other industrial equipment. Trays may be supported by Globe-Strut® Channel Framing (see U.S.G. Product Folder SA-1510 for suggested support system). Other features:

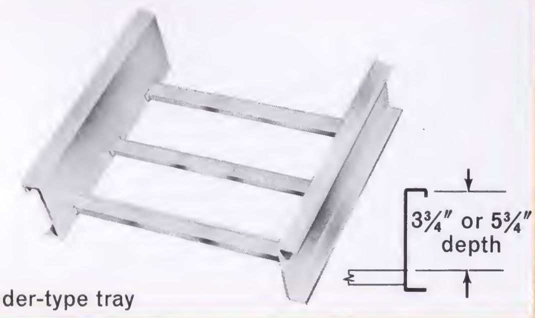
Maximum Cable Space—design allows full inside width and depth of tray to be utilized for cable.

Electrical Continuity—standard splice plate connections offer less than .00033 ohm resistance—assure electrical continuity between all sections in system. Trays are suitable as a grounding conductor.

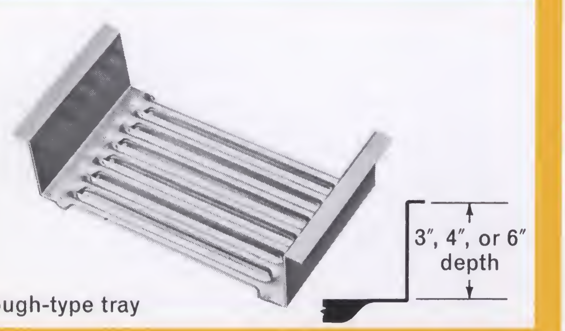
Structural Continuity—These high-strength, engineered assemblies provide firm resistance to seismic forces and cable loads. Load-carrying capacities of all components—trays, fittings and accessories—are design-matched for complete system integrity.

Easy Inspection—design of trays, except solid-bottom type, exposes installed cable for inspection from top and bottom.

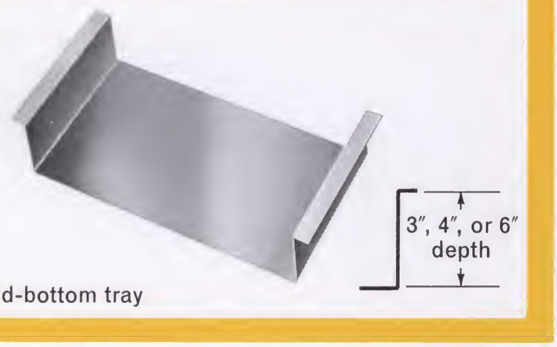
Maximum Cable Protection—smooth buttonhead bolts and turned-out side rail flanges eliminate potential damage sources—assure maximum protection for installed cable. Inside of tray has no sharp edges, burrs or projections to damage cable insulation.



ladder-type tray



trough-type tray



solid-bottom tray

types and functions

GLOBETRAY Ladder-Type Cable Tray

Straight sections and fittings consist of stiffened-channel rungs located between channel-shaped side rails having outward projecting flanges. Straight-section side rails have a top flange at least 13/16″ wide and a min. ⅜″ vertical stiffening lip. Side rail flanges of fittings are at least 13/16″ wide. Rungs are positioned with web up to provide a cable-support surface at least ⅞″ wide excluding corner radii. Rungs are MIG-welded to side rails and welds are cleaned. Available in medium and heavy-duty models (data below).

Ladder-type trays provide maximum ventilation to power cables and other heat-producing cables; however, cables are vulnerable to damage from external sources. The wider space between rungs meets minimum support requirements with maximum economy where cable load will not crush insulation and cable sag will be acceptable.

GLOBETRAY Trough-Type Cable Tray

Straight sections are one-piece construction with integral cross rungs 1″ o.c. Rungs have a semi-circular cross-section, ½″ wide. Side rails have min. ⅝″-wide top flanges projecting horizontally outward. Solid-bottom tray fittings, used in this system, have ends beaded to provide a smooth interior.

Trough-type trays, with their narrow openings in the tray bottom, provide cables with good protection from external damage, superior support and ample ventilation. Solid-bottom fittings generally create no ventilation problems since they are a small part of the system; cables are adequately ventilated through straight sections.

GLOBETRAY Solid-Bottom Cable Tray

Straight sections and fittings feature a completely closed bottom. Straight sections are one-piece construction. Side rails have min. ⅝″-wide top flanges projecting horizontally outward. Tray sections are joined using H-bars to eliminate sharp edges.

Solid-bottom trays provide cables with excellent shielding, support and protection from external damage. Used primarily for instrumentation, control, communication and other non-heat producing cables. They also meet requirements for trays that must pass through fire-resistant construction.

product data—straight sections

tray type	nom. inside depth—in.	inside width—in.	standard length—ft.	rung spacing—in.
ladder-type				
medium-duty steel and alum.	4, 6	6, 9, 12, 18, 24, 30, 36	12	6, 9, 12, 18
heavy-duty steel and alum.	4, 6	6, 9, 12, 18, 24, 30, 36	12, 24	6, 9, 12, 18
trough-type				
steel and alum.	3, 4, 6*	4*, 6, 9, 12, 18, 24, 30*	12	1
solid-bottom				
steel and alum.	3, 4, 6*	6*, 9, 12, 18, 24, 30, 36*	12	—

*These width and depth combinations are not available.

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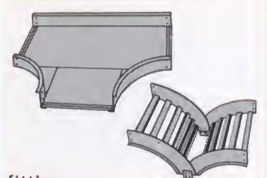
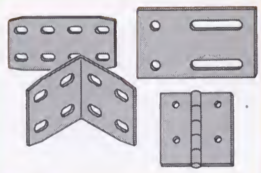
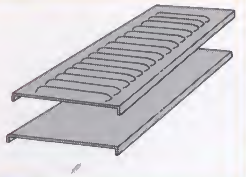
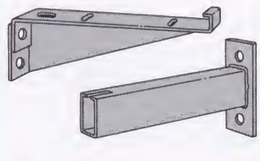
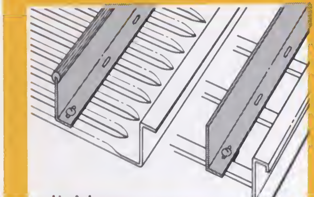
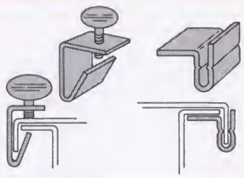

fittings

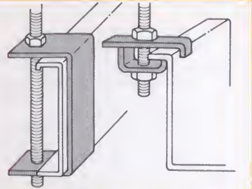

splice plates

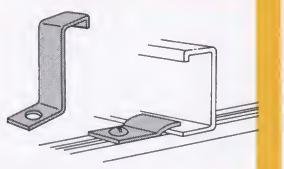

covers


supports


dividers


cover clips


hanger clamps


hold-down clamps

materials and finishes

Steel—steel used is of commercial quality, with a standard galvanized finish conforming to ASTM A525. Also available hot-dipped galvanized after fabrication per ASTM A386 or with polyvinyl chloride (PVC) coating.

Aluminum—aluminum alloys used are selected for appropriate structural and physical properties. Trays are usually supplied with a natural finish, but PVC coating can be applied for additional protection.

fittings and accessories

Fittings and accessories in steel and aluminum are available, as outlined below, to complete the cable tray system installation. Consult current GLOBETRAY Cable Tray literature for available product sizes and details.

Fittings—elbows, risers, tees, crosses and reducers are used to join other tray sections and change size or direction of the system. Solid-bottom fittings are standardized to serve both trough and solid-bottom installations and provide economy.

Splice Plates—flat, 90° adjustable, expansion, extra-strength, grounding straps, reducer plates.

Covers—solid and louvered, flanged or non-flanged, are available for all straight sections. Solid covers, flanged and non-flanged, for all fittings. Cover clamps, extenders and clips to secure covers to tray sections and fittings.

Supports—cable hanger elbows, cable tray support brackets and channels, tray hanger clamps, hold-down clamps. For other support material—channel framing, beam clamps, threaded rod or concrete inserts—see GLOBE-STRUT Channel Framing catalog G-530.

Miscellaneous Accessories—blind ends, connectors, divider strips for straight sections and fittings, drop-out plates and bushings, cable and conduit clamps, rollers and pulleys for cable installation are available as normal accessories.

safe uniform load

The tables below show safe uniform load and deflection for 12″-wide trays. Consult current GLOBETRAY Cable Tray literature for data on other sizes.

load-deflection data—12-in. wide tray (1)

tray type & material	6′ clear span				8′ clear span				10′ clear span				12′ clear span			
		deflection—in.				deflection—in.				deflection—in.				deflection—in.		
	load—lb./ft.	3″ depth	4″ depth	6″ depth	load—lb./ft.	3″ depth	4″ depth	6″ depth	load—lb./ft.	3″ depth	4″ depth	6″ depth	load—lb./ft.	3″ depth	4″ depth	6″ depth
solid-bottom—model u																
steel	250	.13	.10	.03	200	.27	.24	.08	128	.44	.37	.12	89	.63	.54	.17
aluminum	212	.12	.10	.04	171	.26	.24	.08	110	.42	.35	.12	77	.61	.52	.17
trough-type—model u																
steel	211	.43	.29	.17	118	.75	.52	.29	76	1.18	.81	.46	52	1.68	1.16	.66
aluminum	188	.54	.29	.12	105	.95	.51	.20	67	1.49	.79	.32	46	2.12	1.13	.44

load-deflection data—12-in. wide tray, 9-in. rung spacing (1)

tray type & material	6′ clear span				8′ clear span				10′ clear span				12′ clear span			
	4″ depth		6″ depth		4″ depth		6″ depth		4″ depth		6″ depth		4″ depth		6″ depth	
	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.
ladder-type—medium duty																
steel	484	.288	222	.058	272	.513	167	.138	174	.802	133	.271	121	1.155	111	.470
aluminum	285	.370	295	.160	160	.657	166	.286	103	1.027	106	.447	71	1.479	75	.644

load-deflection data—12-in. wide tray, 9-in. rung spacing (1)

tray type & material	12′ clear span				14′ clear span				16′ clear span				18′ clear span				20′ clear span			
	4″ depth		6″ depth		4″ depth		6″ depth		4″ depth		6″ depth		4″ depth		6″ depth		4″ depth		6″ depth	
	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.	load—lb./ft.	defl.—in.
ladder-type—heavy duty																				
steel	270	1.153	394	.647	198	1.570	289	.882	152	2.051	222	1.152	120	2.596	175	1.458	97	3.205	142	1.800
aluminum	184	1.558	310	.879	136	2.120	228	1.196	104	2.770	175	1.563	82	3.505	138	1.979	66	4.327	112	2.443

(1) Loads shown include 1.5 safety factor and are for cable tray supported on simple span and without splice connectors in the span.
For data on other sizes and appropriate tray type, see U.S.G. catalog.

SA
1610

GLOBETRAY® Cable Trays

specifications

GENERAL PROVISIONS

work included
The electrical contractor shall furnish all labor, material and equipment to install the cable tray system and necessary support system as shown on the drawings and described in these specifications.

related standards
Unless otherwise specified herein, the cable tray system and supports shall conform to current NEMA Standards Publication, No. VE-1.

submittals
Upon request, the contractor shall submit: (manufacturer's catalog illustrating all components and certified load-capacity data for the cable trays, splice connectors, supports and support anchorage) (drawings showing layout of system assembly) (detail drawings of all components and attachment to adjacent work and to each other) (straight-section tray samples).

handling and storage
Cable tray shall be handled with suitable slings to spread loading during lifting and not lifted by rungs. Cable tray materials shall be stored in a dry, well-ventilated location. In outside storage, materials shall be stacked on level mudsills, protected from the elements and properly ventilated to prevent condensation. Under humid conditions, cable tray sections shall have packing removed to prevent staining.

qualifications
All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

BASIC MATERIALS AND METHODS

materials and finish
All cable tray straight sections, fittings, splice plates, divider strips, tray-to-box connectors and drop-outs shall be (steel, with hot-dipped mill-galvanized finish per ASTM A525) (steel, with hot-dipped galvanized finish after fabrication) (aluminum alloy, natural finish). All nuts, bolts and washers shall be (steel, zinc electro-plated), (stainless steel) (aluminum alloy 2024).

type and size
Cable tray system(s) shall be following type(s) and size(s):

a. GLOBETRAY Ladder-Type Cable Tray—Straight sections and fittings with stiffened-channel rungs between channel-shaped side rails having outward-projecting flanges. Straight-section side rails with a top flange at least 13/16″ wide and a 3/8″ min. stiffening lip. Fittings with side-rail flanges not less than 13/16″ wide and having (12″) (24″) (36″) min. radius. Straight sections and fittings providing (3¾″) (5¾″) clear inside depth and clear inside widths as shown on drawings. Rungs positioned with web up to provide a flat, cable-support surface at least 7/8″ wide excluding corner radii. Rung spacing (6″)(9″) (12″) (18″) on straight sections, 6″ max. on fittings measured at center line of fitting. Rungs MIG-welded to side rails with welds cleaned. Inside of tray to present no sharp edges, burrs or projections to damage cable insulation.

b. GLOBETRAY Trough-Type Cable Tray—Straight sections of one-piece construction with integral semicircular cross rungs, ½″ wide, and spaced 1″ o.c. Side rails with min. 3/8″-wide top flanges projecting horizontally outwards. Straight sections and fittings providing (3″)(4″)(6″) clear inside depth and clear inside widths as shown on drawings. Fittings of solid-bottom type with (12″) (24″) (36″) min. radius and with ends beaded to provide a smooth interior. Inside of tray to present no sharp edges, burrs or projections to damage cable insulation.

c. GLOBETRAY Solid-Bottom Cable Tray—Straight sections of one-piece construction with the bottom completely closed on straight sections and fittings. Side rails with min. 3/8″-wide top flanges projecting horizontally outward. Straight sections and fittings providing (3″)(4″)(6″) clear inside depth and clear inside widths as shown on drawings. Fittings with (12″)(24″) (36″) min. radius. Tray sections joined with H-bars to eliminate sharp edges. Inside of tray to present no sharp edges, burrs or projections to damage cable insulation.

load capacity
When tested in accordance with NEMA load test procedure, the cable tray system shall be capable of supporting a total cable load of ( ) lb. per lin. ft. with a safety factor of ( ) for a ( ) ft. simple span without a splice, and for a two-span condition with ( ) ft. between supports with a splice at any location.

Straight sections and fittings shall not permanently deform under a ( )-lb. static concentrated load applied vertically along a 4″ length for both following conditions:

a. Load applied to one side rail of tray section having specified cable load and support spacing. Load shall be applied at midpoint between supports over a splice connection.

b. Load applied to one rung of empty tray section having specified support spacing. Load shall be applied at midpoint between side rails and supports.

supports
Supporting systems for cable tray shall be of type shown on the drawings. Load capacity and location of supports shall comply with NEMA Standards.

splice connectors
Splice connectors shall be used to join straight sections to each other and to fittings. Splices shall maintain specified loading and safety factor. Expansion-type splices shall be used wherever expansion joints occur in the base structure or where shown on the drawings.

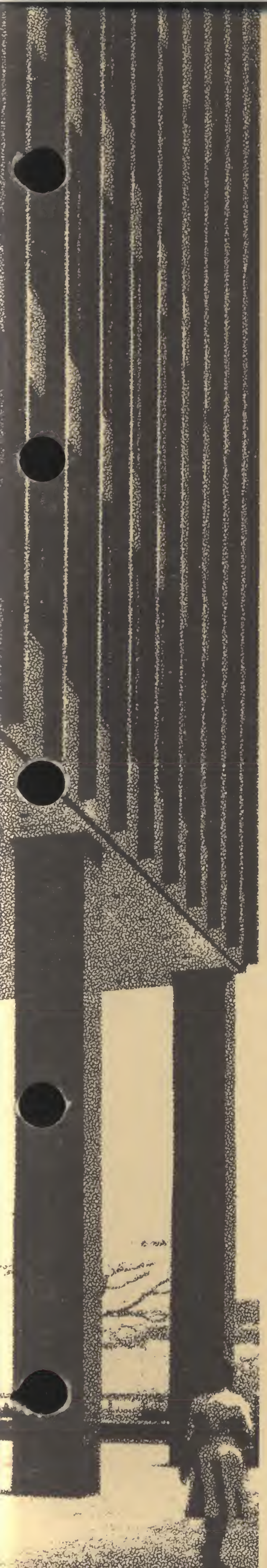
electrical continuity
Connections between adjacent sections of the cable tray shall have 0.00033 ohm max. resistance as tested in accordance with NEMA Standards. All expansion and adjustable splices and fittings shall be equipped with a grounding strap. The cable tray system shall be grounded per NEC Article 318.

covers and accessories
Covers for straight sections and fittings shall be (solid) (louvered)(flanged)(non-flanged). Cover attachment devices, tray divider strips, hold-down clamps, cable anchors and other accessories required for complete system installation shall be manufacturer's standard components.

installation
Cable tray system shall be installed to conform to requirements of NEC Article 318. Nothing in these specifications or drawings shall overrule the provisions of this Article.

GLOBETRAY Cable Tray Systems are available through distributors in principal cities. Consult our local representative for information, or write directly to: Metal Products Division, United States Gypsum Company, 101 So. Wacker Dr., Chicago, Ill. 60606.

UNITED STATES GYPSUM
BUILDING AMERICA
Metal Products Division, 101 South Wacker Drive, Chicago, Ill. 60606
SA-1610/USG/1-77
Printed in U.S.A.



U.S.G.

partitions & walls
ceilings & floors
demountable partitions
roof assemblies

HIGHLIGHTS–1977 ARCHITECTURAL TECHNICAL LITERATURE

This new series of 29 technical folders replaces all previous folders except those numbered as follows:

SA-306
KMD-S
73000
SA-915
SA-1030
SA-1510

Three new folders are included to be placed behind their appropriate division tabs:

SA-510	Light-Gauge Steel Framing
SA-707	THERMAFIBER® Fire Safety Systems
SA-1610	GLOBETRAY® Cable Trays

One folder—SA-405 Gypsum Tile Partition Systems—has been discontinued.

Other new features in the '77 series are:

Div. 1 Selector

—5 new fire and sound test analyses as follows: 1 partition, 3 ceilings and floors, 1 roof/ceiling assembly, updated index. (SA-100)

Div. 3 Decks, Floors

—1-1/2-hour roof/ceiling assembly providing "U" value of 0.05. (SA-305)

Div. 5 Grating, Light-Gauge Framing

—High-strength alloy for aluminum grating and stair treads. (SA-506)

—Load-bearing studs and joists for light residential construction. (SA-510)

Div. 7 Insulation

—Flame-resistant mineral fiber insulating blankets for wood and steel framing. (SA-705)

—Proven fire-protective insulations for curtain walls and perimeter framing. (SA-707)

Div. 8 Curtain Walls

—High-performance Infill Panel System for prefinished exterior curtain wall panels. (SA-805)

Div. 9 Acoustical Treatment

—New Boulder and Butte patterns in ACOUSTONE® Ceiling Panels, Mecca pattern in AURATONE® Panels, noise control panels and screens, four earthtone colors for acoustical tile, two colors for mirrored ceiling panels, 1-1/2-hour acoustical panel ceiling. (SA-905)

Div. 9 Lath, Plaster

—Energy-saving, steel-framed veneer finish wall furring systems. (SA-912)

#9 Gypsum Drywall

—Cavity shaft wall with 6" E-studs for lobbies and mechanical rooms. (SA-922)

—2-hour ceiling with panels screw-attached to suspended grid; 1-hour ceiling with light-gauge steel joists; energy-saving drywall wall furring systems. (SA-923)

—Asbestos-free joint compounds in drying and hardening types. (SA-927)

—Exclusive mix-and-match Standard and Custom patterns in vinyl-faced gypsum wall panels. (SA-928)

Div. 9 Paints, Coatings

—Low-lustre exterior finish, latex floor enamel, interior latex stain, complete line of interior texture surface finishes. (SA-933)

Div. 10 Demountable Partitions

—Attractive, cost-saving steel and vinyl components, perimeter isolation details. (SA-1020)

Div. 16 Electrical

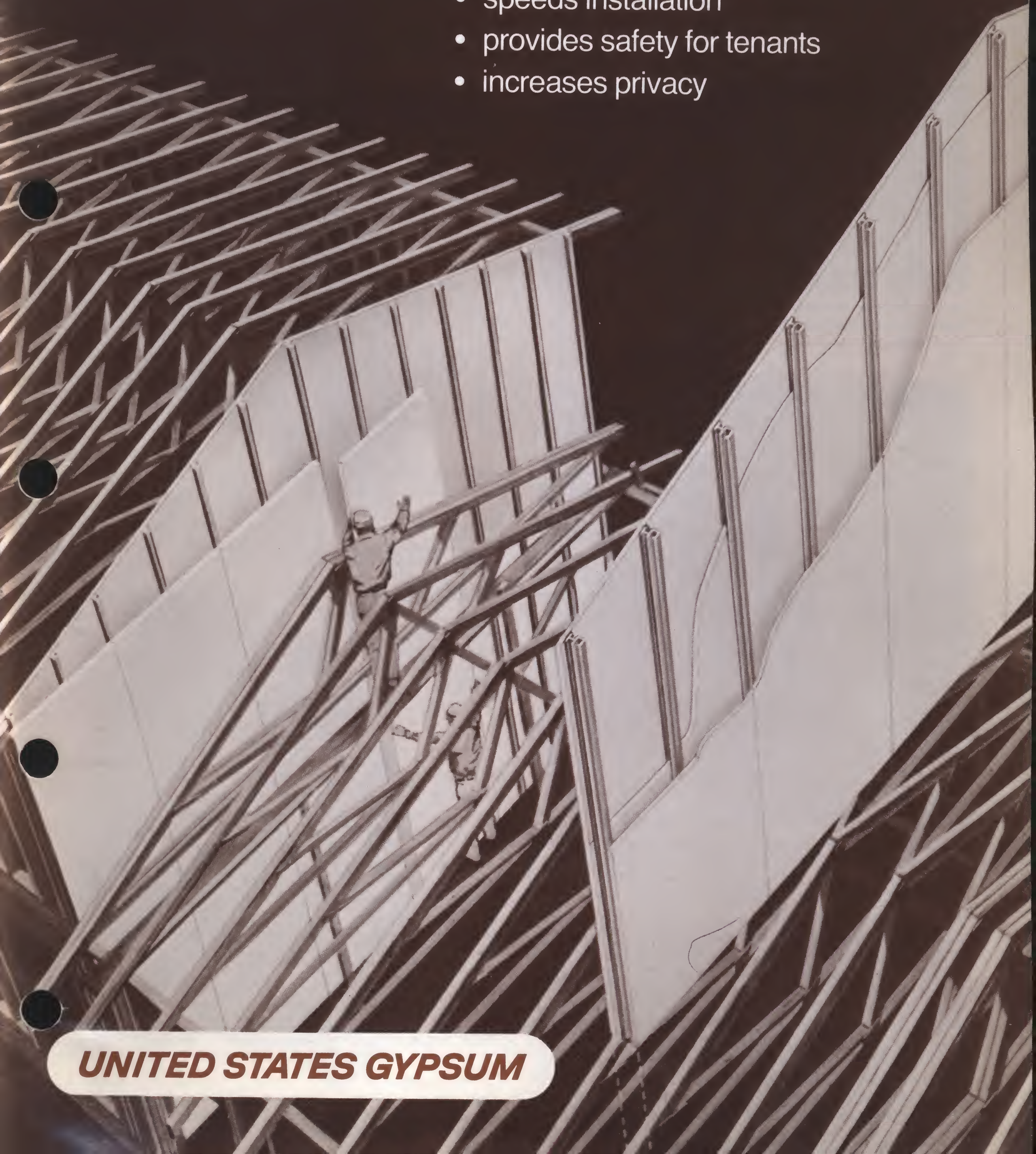
—Ladder, trough type and solid-bottom cable trays; fittings and accessories. (SA-1610)

USG® Area Separation Walls

Lower-cost, fire- and sound-resistant, improved cavity system . . .

- speeds installation
- provides safety for tenants
- increases privacy

9.6/Ung



UNITED STATES GYPSUM

USG Area Separation Walls

Fast-erecting drywall partitions for economical fire barriers in multi-family housing

USG Area Separation Walls are designed as a fire and sound barrier between units in multi-family wood-frame buildings such as garden apartments, condominiums and townhouses. Some code bodies and localities identify this type of wall by various names such as fire wall or barrier, lot line wall or party wall.

An economical combination of noncombustible gypsum panels and steel components, USG Area Separation Walls provide a protective barrier with sufficient structural stability under fire conditions to allow collapse of the structure on one side while maintaining its integrity on the other.

There is a choice of two cost-reducing systems—*Cavity Type* and *Solid Type*. Both systems are continuous, vertical wall assemblies of gypsum panels attached to steel framing that extend from foundation through the roof and act as barriers to fire and sound transmission. Because they combine comparable fire and sound resistance in a thin, space-saving partition at *lower in-place cost,* they are superior to masonry construction in meeting code requirements for multi-unit buildings.

Improved Cavity Type Wall is used as a commonly shared party wall with non-load bearing framing. Consists of new, lighter steel C-H Studs, 1-in. gypsum liner panels set in steel runners and faced both sides with lightweight SHEETROCK W/R FIRECODE "C" Gypsum Panels.

In this cavity system, liner panels are erected vertically with ends set into 2½-in. USG J-Runners and edges inserted into specialy formed 2½-in. USG Steel C-H Studs screw-attached to runners. J-runners are installed singly at top and bottom of wall and back-to-back between vertical liner panels on a line 3 in. above each intermediate floor.

Aluminum angle clips, which attach studs to adjacent wood framing, melt and break away when exposed to fire, permitting a fire-damaged structure to fail while the fire barrier remains intact. To improve sound transmission loss, THERMAFIBER Sound Attenuation Blankets are inserted in the stud cavity and RC-1 Resilient Channels may be used to isolate the face layer.

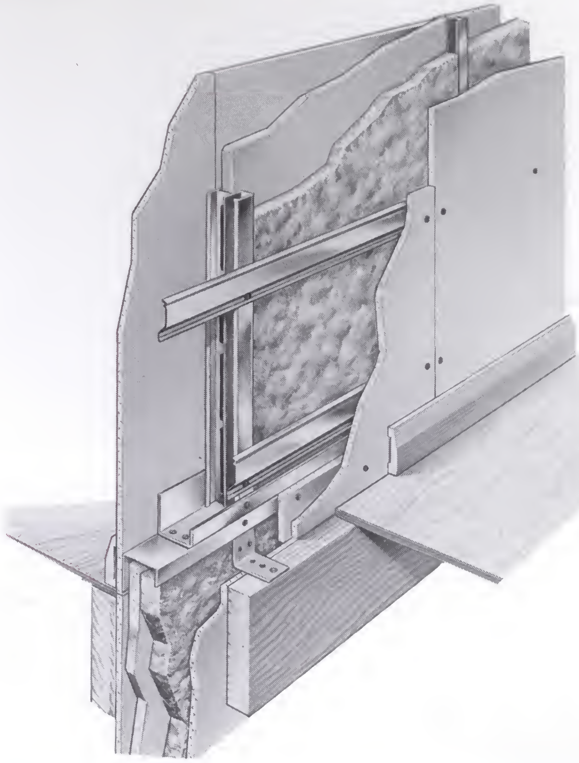
With USG Steel C-H Studs 212CH5 spaced 24 in. o.c., the assemblies are suitable for floor-to-ceiling heights up to 11 ft. under 5-psf lateral load and up to 8 ft. as exterior walls under 15-psf wind load without exceeding 1/240 allowable deflection.

Solid Type Wall is constructed of separately framed panels on both sides of the fire barrier and is preferred when floor joists are perpendicular to the wall. May be used with either non-load bearing or load-bearing framing, and consists of double-layer of 1-in. thick gypsum liner panels installed vertically between 2-in. USG Steel J-Runners.

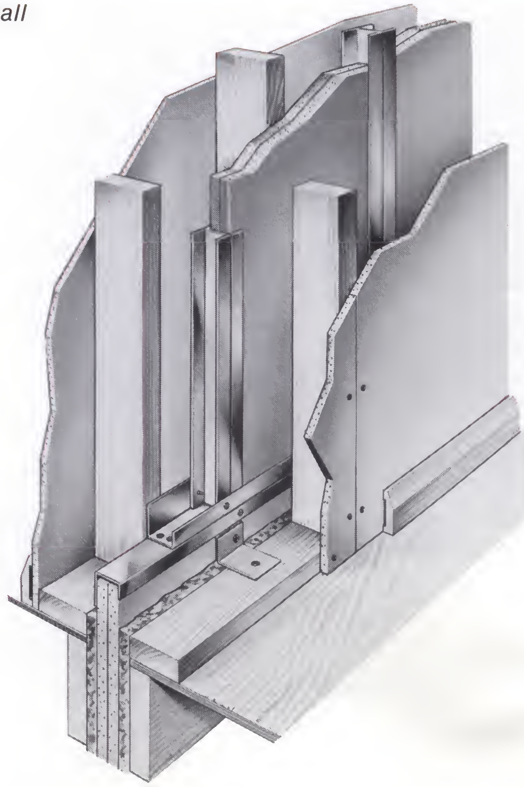
To complete the solid system, panel edges are inserted in 2-in. USG Steel H-Studs spaced 24 in. o.c. and screw-attached to runners. J-runners are installed at top and bottom of wall and back-to-back between vertical panels at a convenient height above each intermediate floor. Steel studs are attached to wood framing with 0.063″ aluminum angle clips which break away when exposed to fire. As with the cavity system, they permit a fire-damaged structure to collapse without causing the fire barrier to fail.

With USG Steel H-Studs 200HS7, the assembly is suitable for floor-to-ceiling heights up to 10 ft. under 5-psf lateral load without exceeding 1/240 allowable deflection.

cavity wall



solid wall



Construction using the breakaway aluminum clip is covered by Patent No. 3,974,607.

Copyright 1977, United States Gypsum Company

7 EXCLUSIVE FEATURES FOR BUILDER AND TENANT

safety for occupants

Both USG Separation Walls offer 2-hour fire ratings; the cavity system qualifies for 3-hour rating with an additional layer of ⅝" SHEETROCK W/R FIRECODE "C" panels. Concealed openings in the construction are fire-stopped at each floor/ceiling level to resist vertical spread of fire. Assemblies have sufficient structural stability under fire to meet the fire-protection requirements of code bodies.

Request a viewing of the U.S.G. movie, "Fire Proved", which demonstrates how effectively Area Separation Walls protect adjacent areas or living units from fire and heat damage.

weight, cost savings

These assemblies use low-cost materials and save jobsite labor. Because they are lighter in weight—50% less than masonry walls—less material has to be handled during installation and in-place costs are reduced.

speed occupancy

Using procedures familiar to the trade, carpenters can erect these systems together with or immediately after completion of the framing and roof trusses. This provides good job continuity and eliminates the delays of waiting for masonry erection or for mortar to dry. Dry construction permits installation in any weather men normally work to minimize cold-weather delays. Other trades can begin sooner—projects move faster, buildings are occupied sooner for quicker rental income and lower interim costs.

improve privacy

The systems provide economical sound control that helps apartments to sell or rent quicker with less turnover. The cavity wall, with single-layer ½-in. face panels and 1-in. THERMAFIBER Sound Attenuation Blankets in the cavity, offers 47 STC rating, or 50 STC with RC-1 Resilient Channels and 1½-in. blankets; 57 STC with double-layer ⅝-in. gypsum panels attached to the RC-1 Channels, 1½-in. THERMAFIBER Blankets in cavity and single-layer panels one side.

The solid wall offers 57 STC rating with single-layer ⅝-in. face panels attached to 2x3 wood studs and THERMAFIBER Insulating Blankets in stud cavity on each side of the solid fire barrier. The assembly provides 54 STC with blankets on only one side and 45 STC without insulation.

increase floor space

The thinner 3½ to 4-in. width for cavity walls, compared to 8 to 12-in. for masonry walls without interior finish, means added floor space available for each unit. This can allow additional income-producing units to be included.

high-quality components

Most components of these systems are designed to permit temporary exposure to inclement weather during construction. Moisture-resistant paper facings on USG Gypsum Liner Panels shed water, protect the special fire-resistant core. Structural runners and studs are formed from hot-dipped galvanized steel for added corrosion resistance. THERMAFIBER Sound Attenuation Blankets are encased in vinyl film to resist water damage. SHEETROCK W/R FIRECODE "C" Panels have a water-resistant gypsum core and multi-layered green face and brown back paper chemically treated to combat moisture penetration.

Panels, ½ or ⅝-in. thick and 4-ft. wide with tapered edges, are available in lengths up to 12-ft. Trim, corner bead, screws, other accessories are available to complete project.

Aluminum angle clips provide attachment of USG Area Separation Wall to adjacent wood framing; clips melt and break away when exposed to fire. Fire barrier remains intact while fire-damaged structure fails.

No delays in siding application are encountered with USG Area Separation Walls since same crews install firewalls, siding and roofing.

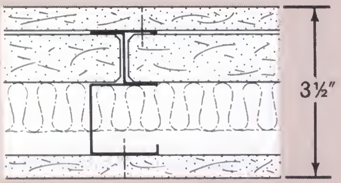
performance-tested and proved

Engineered and field-tested to provide optimum performance and meet design requirements, these systems may be used in buildings up to three stories high and with all common floor-ceiling heights found in multi-family housing. Both cavity and solid types are suitable for exterior walls with appropriate weather-resistant facing when offset sloping roofs are desired; also for use with flat decks of wood or poured gypsum concrete. Gypsum roof decks satisfy fire code requirements without above-deck firewall extensions; also allow drainage slopes to be formed in the slab instead of the framing.

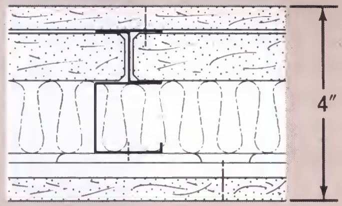
details

rated assemblies

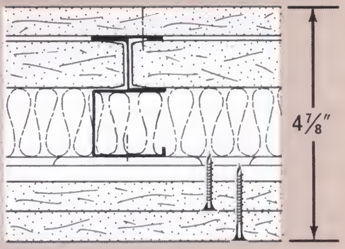
cavity walls



2 Hrs. est. based on U of C 6-23-75
47 STC—BBN-750704

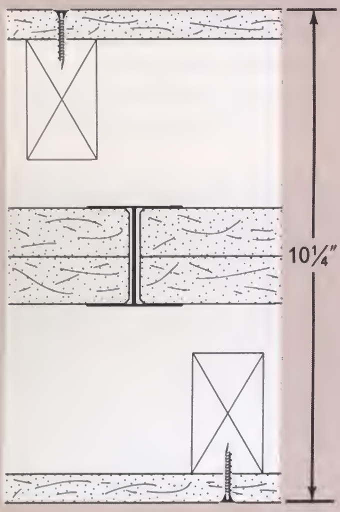


2 Hrs. est. based on U of C 6-23-75
50 STC—BBN-750411

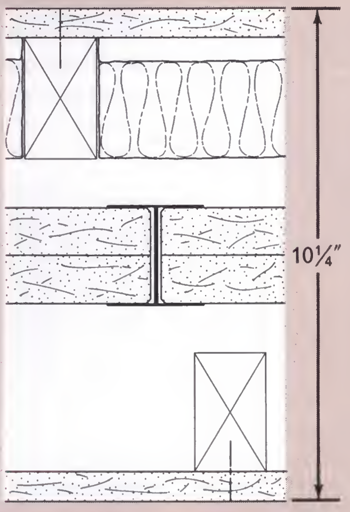


3 Hrs. est. based on U of C 2-16-72
57 STC—BBN-730622

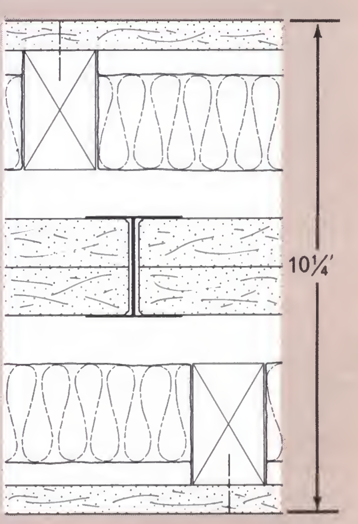
solid walls



2 Hrs. est. based on T-4481-OSU
45 STC—BBN-730104—no blkts.

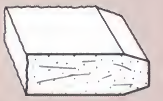


2 Hrs. est. based on T-4481-OSU
54 STC—BBN-730103—blkts. 1 side

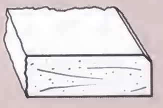


2 Hrs. est. based on T-4481-OSU
57 STC—BBN-730102—blkts. 2 sides

components

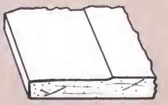


1″ USG gypsum
liner panel
(C-H stud)

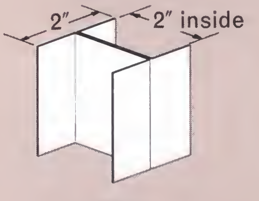


1″ USG gypsum
liner panel
(H-stud)

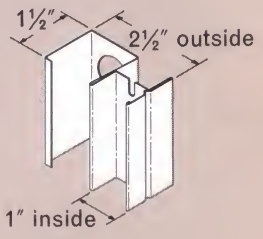
SHEETROCK W/R
FIRECODE "C"
gypsum panel



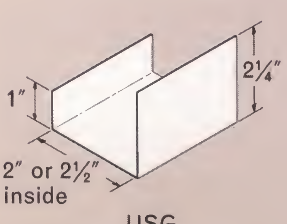
SHEETROCK
FIRECODE "C"
gypsum panel



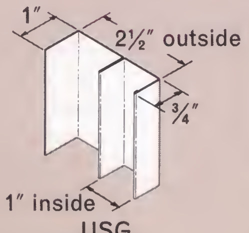
USG
steel H-stud



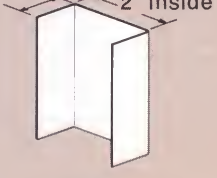
USG
steel C-H stud



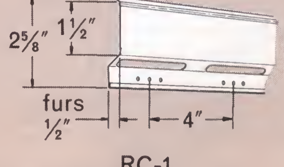
USG
steel J-runner



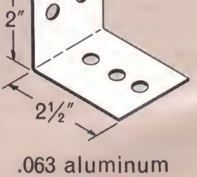
USG
steel E-stud



USG
steel C-stud

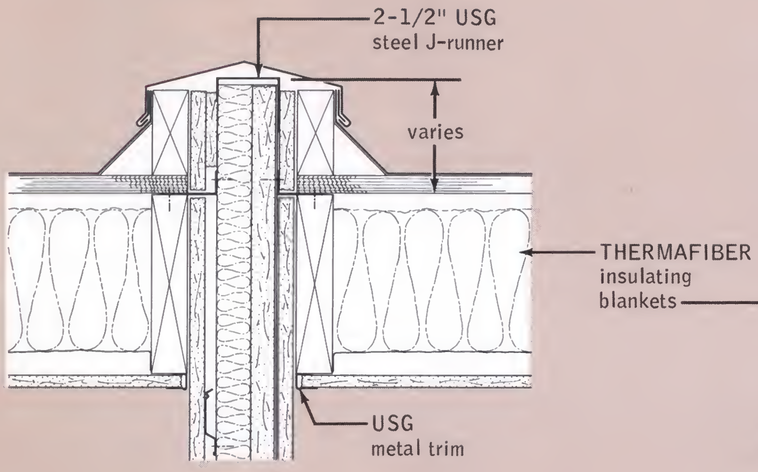


RC-1
resilient channel

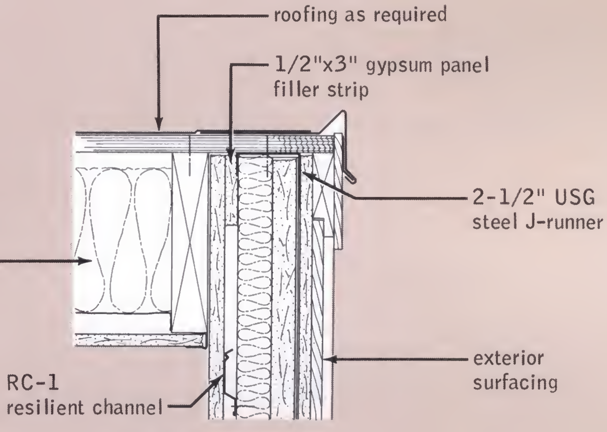


.063 aluminum
angle clip

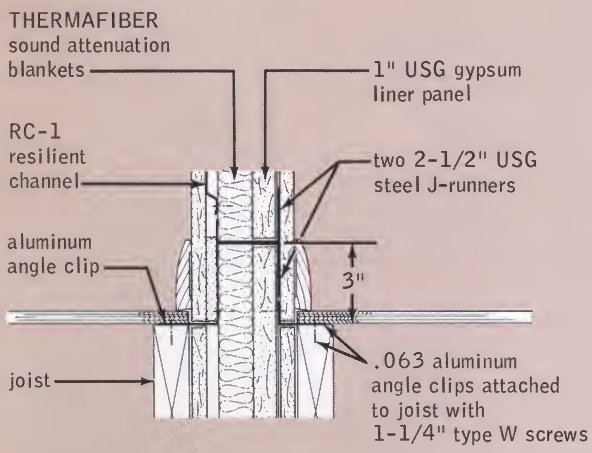
cavity walls



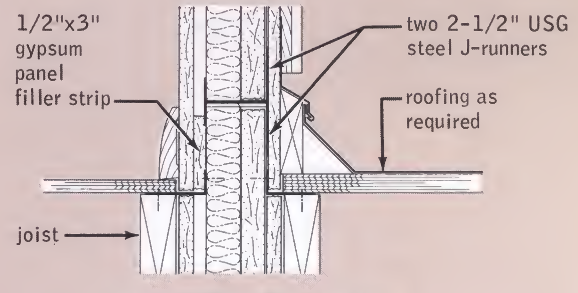
roof parapet



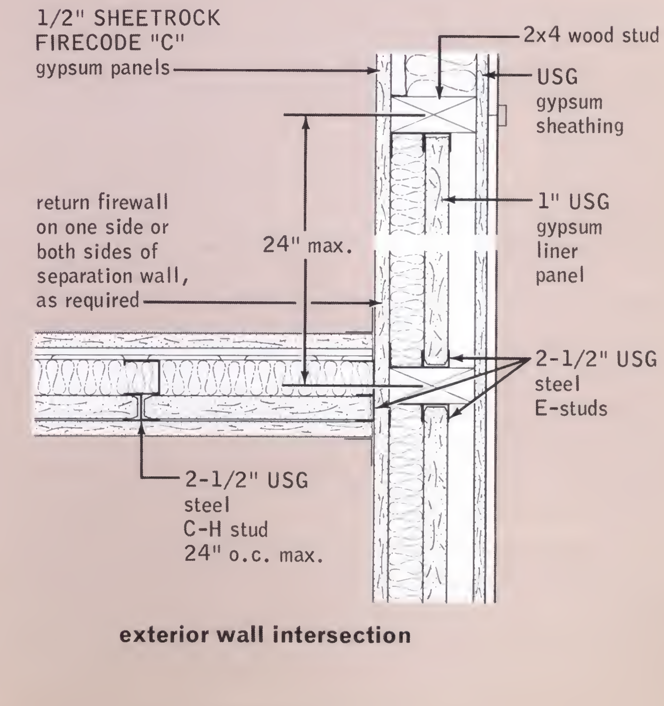
roof at rake end


THERMAFIBER sound attenuation blankets
1" USG gypsum liner panel
RC-1 resilient channel
two 2-1/2" USG steel J-runners
aluminum angle clip
3"
joist
.063 aluminum angle clips attached to joist with 1-1/4" type W screws

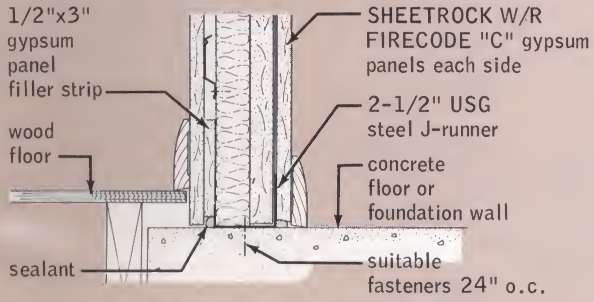
intermediate floor


1/2"x3" gypsum panel filler strip
two 2-1/2" USG steel J-runners
roofing as required
joist

intermediate floor/roof


1/2" SHEETROCK FIRECODE "C" gypsum panels
2x4 wood stud
USG gypsum sheathing
return firewall on one side or both sides of separation wall, as required
24" max.
1" USG gypsum liner panel
2-1/2" USG steel E-studs
2-1/2" USG steel C-H stud 24" o.c. max.

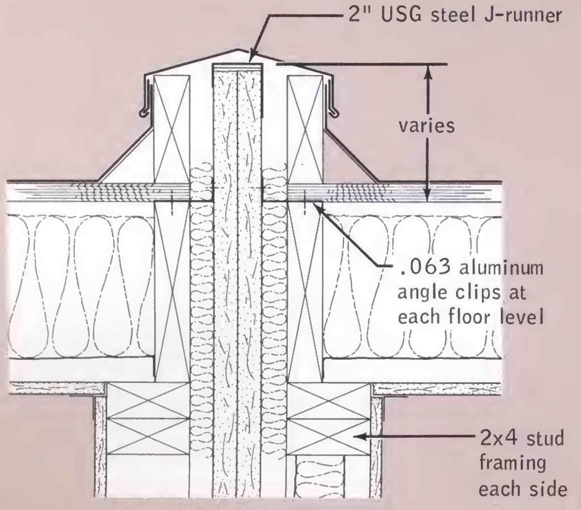
exterior wall intersection


1/2"x3" gypsum panel filler strip
SHEETROCK W/R FIRECODE "C" gypsum panels each side
2-1/2" USG steel J-runner
wood floor
concrete floor or foundation wall
sealant
suitable fasteners 24" o.c.

foundation

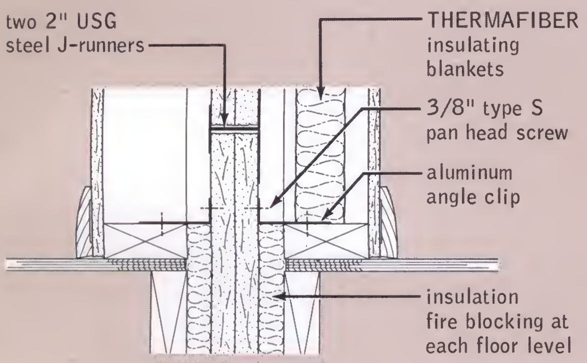
solid walls

area separation walls/solid type



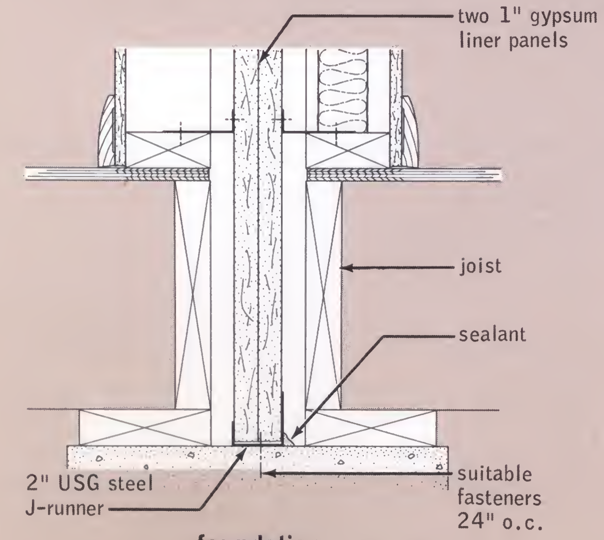
2" USG steel J-runner
varies
.063 aluminum angle clips at each floor level
2x4 stud framing each side

roof parapet



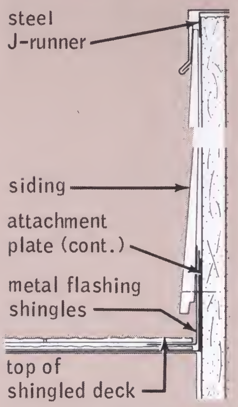
two 2" USG steel J-runners
THERMAFIBER insulating blankets
3/8" type S pan head screw
aluminum angle clip
insulation fire blocking at each floor level

intermediate floor

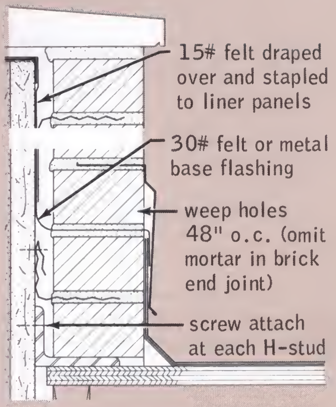


foundation

optional roof intersections

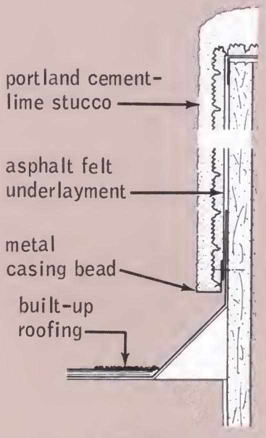


wood siding

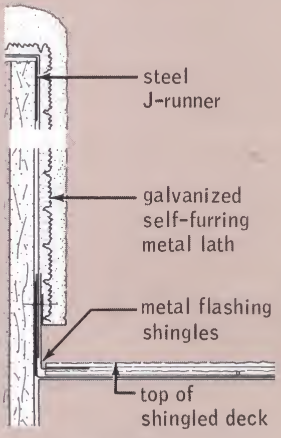


15# felt draped over and stapled to liner panels
30# felt or metal base flashing
weep holes 48" o.c. (omit mortar in brick end joint)
screw attach at each H-stud

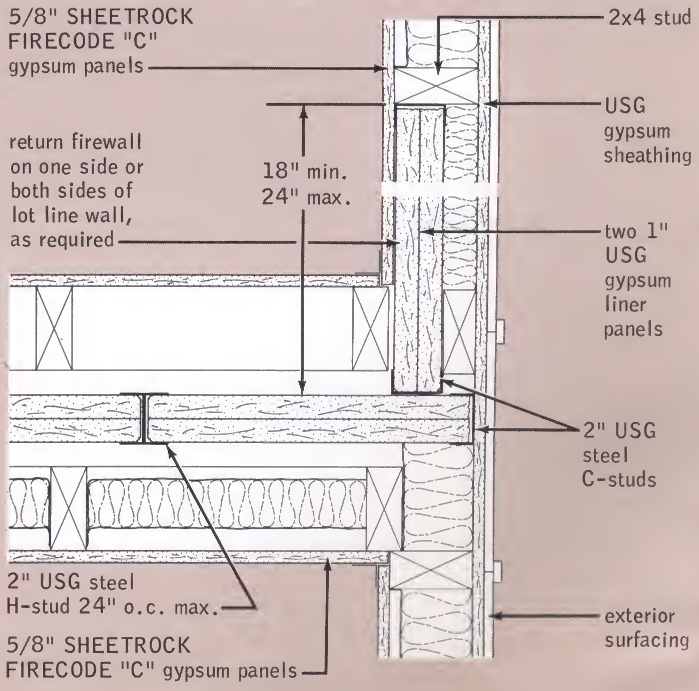
masonry veneer



stucco



stucco



5/8" SHEETROCK FIRECODE "C" gypsum panels
2x4 stud
USG gypsum sheathing
return firewall on one side or both sides of lot line wall, as required
18" min. 24" max.
two 1" USG gypsum liner panels
2" USG steel C-studs
2" USG steel H-stud 24" o.c. max.
5/8" SHEETROCK FIRECODE "C" gypsum panels
exterior surfacing

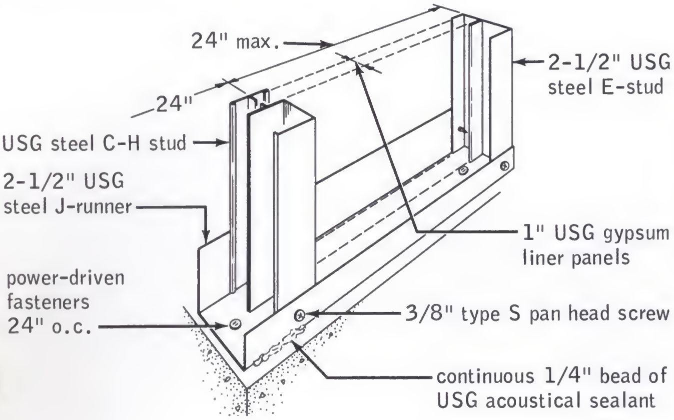
exterior wall intersection

Installation Directions

cavity separation wall

Foundation—Position 2½"-wide steel J-runner at floor and securely attach to foundation with power-driven fasteners at both ends and spaced 24" o.c. When sound control is required, caulk runner at foundation with ¼" bead of USG Acoustical Sealant.

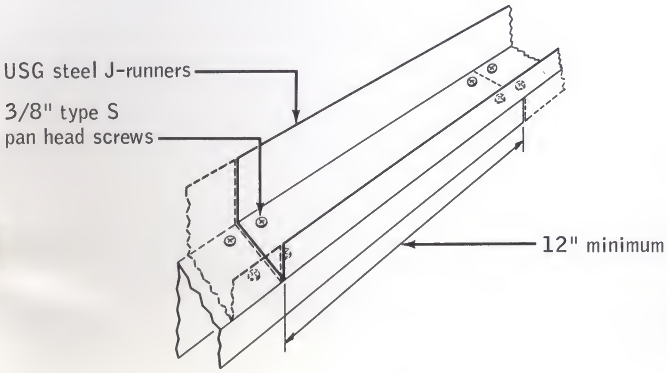
foundation-cavity wall


24" max.
24"
USG steel C-H stud
2-1/2" USG steel J-runner
power-driven fasteners 24" o.c.
2-1/2" USG steel E-stud
1" USG gypsum liner panels
3/8" type S pan head screw
continuous 1/4" bead of USG acoustical sealant

First floor—Install 1" liner panels and steel studs cut to length 3" more than floor-to-floor height. Erect liner panels vertically in J-runner with long edges in groove of C-H stud. Install C-H studs between panels and cap ends of run with E-stud (see detail). Fasten all studs at bottom to J-runner flange with ⅜" type S screws.

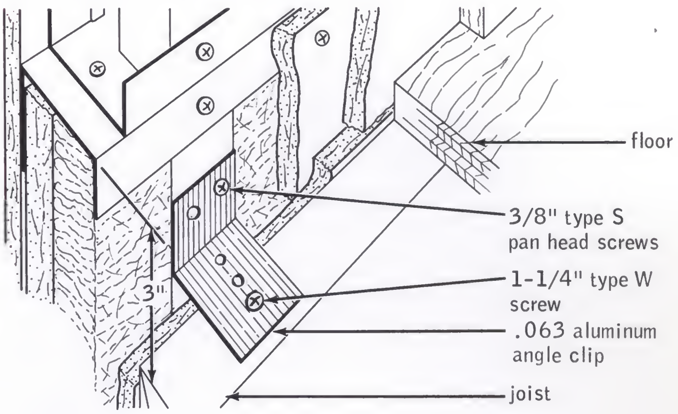
Intermediate floors — Cap top of panels and studs with J-runner and fasten studs to J-runner flanges with ⅜" type S screws. Install bottom J-runner for next row of panels over top runner with end joints staggered at least 12". Fasten runners together with double ⅜" screws at ends and spaced 24" o.c. (see detail). Secure each stud to framing with 0.063" aluminum angle clips, fastened to studs with ⅜" screws and to framing or subfloor with 1¼" type W screws (see detail).

J-runner splice



Roof—Continue erecting studs and panels for succeeding stories as previously described. At roof, cap panels with J-runner and fasten studs to flanges with ⅜" screws. Fasten studs to framing with aluminum clips.

intermediate floor-cavity wall



Sound attenuation blankets—Install blankets between studs and attach to liner panel with five 9⁄16" staples driven through each blanket, one in center and others spaced 3" from each corner. Butt ends of blankets closely and fill all voids.

Resilient channels—When specified, install RC-1 Resilient Channels horizontally to face side of studs, 6" above floor 6" below ceiling joists and max. 24" o.c. Attach channels to studs with ⅜" type S screws driven through holes in mounting flange. Extend channels to ends of runs and attach to E-studs. Splice channel by nesting directly over stud; screw-attach through both flanges. Reinforce with screws at both ends of splice.

Gypsum panels—Apply ½" SHEETROCK W/R FIRECODE "C" Gypsum Panels vertically to both sides of studs. Stagger joints on opposite partition sides. Fasten panels with 1" type S screws spaced 12" o.c. in field and along edges and runner flanges.

Resilient single-layer—Apply ½" gypsum panels vertically to resilient channels and fasten with 1¼" type S screws placed 6" away from stud and 12" o.c. Do not place screws directly over stud.

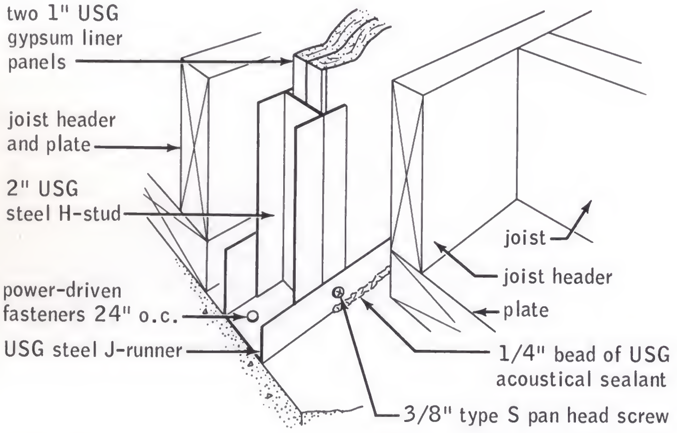
Resilient double-layer—Apply ⅝" gypsum panel base layer horizontally to resilient channels with end joints staggered; fasten with 1¼" type S screws placed 6" away from stud and 12" o.c. Apply ⅝" gypsum panel face layer vertically over base layer and attach with 1⅝" type S screws spaced 12" o.c. and staggered from those in base layer.

Joint treatment—Complete the assembly with DURABOND Joint System applied according to manufacturer's current directions.

solid separation wall

Foundation—Position 2″-wide steel J-runner at floor with short leg toward installation side. Securely attach runner to foundation with power-driven fasteners at both ends and spaced 24″ o.c. Where sound control is required, caulk runner at foundation with ¼″ bead of USG Acoustical Sealant (see detail).

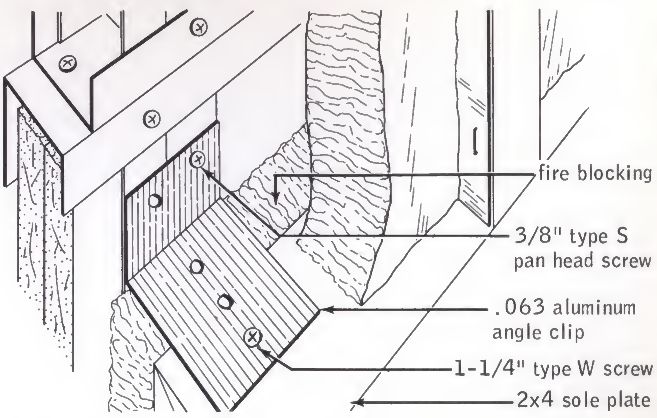
foundation-solid wall


two 1" USG gypsum liner panels
joist header and plate
2" USG steel H-stud
power-driven fasteners 24" o.c.
USG steel J-runner
joist
joist header
plate
1/4" bead of USG acoustical sealant
3/8" type S pan head screw

First floor—Install 1″ liner panels and steel studs cut to convenient length more than floor-to-floor height. Score and snap liner panels. Erect two thicknesses of 1″ liner panels vertically in J-runner with long edges in H-stud. Erect H-studs and double-thickness panels alternately until wall is completed. Install C-stud as cap at ends of run. Fasten all studs to J-runner flange with ⅜″ type S pan head screws. Install wood blocking between framing at mid-floor height, if necessary, to secure end cap against liner panels.

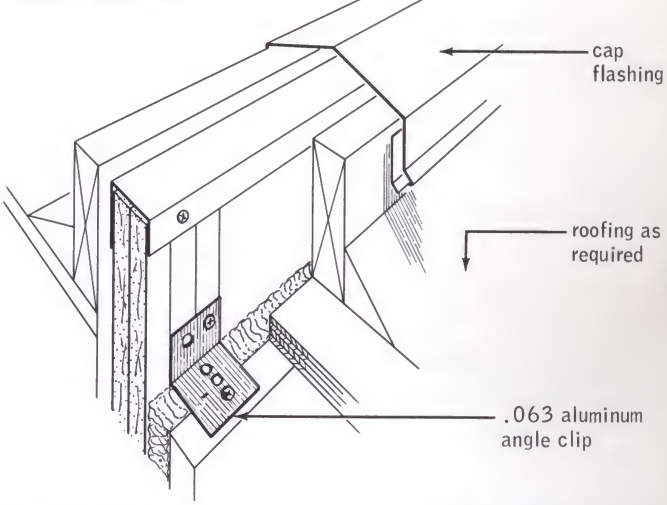
Intermediate floors — Cap top of panels and studs with back-to-back J-runners screw-attached together with double ⅜″ type S screws at ends and spaced 24″ o.c. (see detail). Fasten studs to runner flange with ⅜″ screws. Secure studs to framing with 0.063″ aluminum angle clips screw-attached to studs with ⅜″ screws and to framing with 1¼″ type W screws (see detail). Except at foundation, install fire blocking between joists and fire barrier.

intermediate floor-solid wall



Roof—Continue erecting studs and panels for succeeding stories as described above. At roof, cap panels with J-runner and fasten to studs with ⅜″ screws. Fasten studs to framing with aluminum clips.

roof-solid wall



Interior finish—Screw-apply single-layer ⅝″ SHEETROCK FIRECODE "C" Gypsum Panels to wood studs and joists or nail in conventional manner. Complete the assembly with DURABOND Joint System applied according to manufacturer's current directions.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, FIRECODE, THERMAFIBER, DURABOND.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

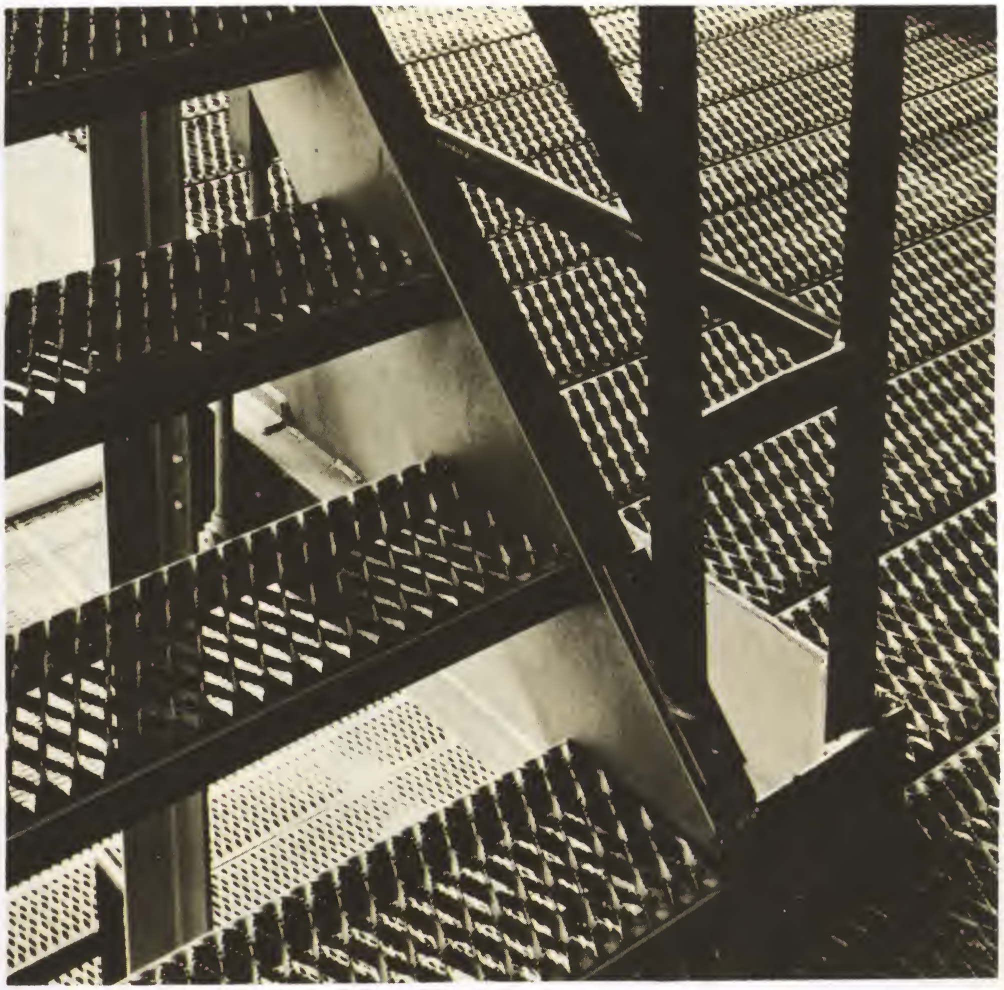
UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

Printed in U.S.A.

GRIP STRUT®

Safety Grating Stair Treads

The serrated surface provides non-slip safety.
Complete, easy-to-use information for selection
of materials, design, and construction of stair systems.



METAL PRODUCTS DIVISION
UNITED STATES GYPSUM

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Specifications 10-11
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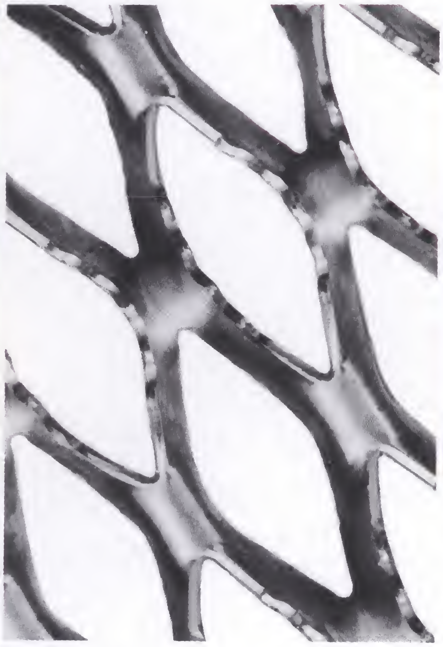
The GRIP STRUT Safety Grating Stair Tread is the safest, most maintenance-free tread you can install

- ☐ **Designs comply with requirements of three major building codes**
- ☐ **Meets Federal Specification RR-G-1602 for slip resistance**
- ☐ **Classified by Underwriters Laboratories Inc., as to slip resistance only. See UL Index of Classified Products.**

the secret of safety

is in the serrated surface. It grips soles securely—in all directions—in all places. There are no flat surfaces where a slip can start. GRIP STRUT is today's safest walking-working surface. That's why it's ideally suited to inside or outside locations where mud, ice, snow, oil, and detergents can create hazardous conditions.



every step is maintenance-free

Open design permits easy draining of fluids, chips, grease, mud and ice. Allows convenient access for cleaning. The serrated edge shears off slip-inducing material under normal foot pressure. Treads are kept clear. Openings are small enough to catch tools or other falling objects.

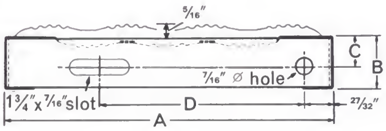
high strength-to-weight

is achieved through one-piece construction. Bridged struts with integral side channels form a high-strength plank that can support loads with minimum transverse or longitudinal deflection. There are no rivets or pressure joints to break or loosen. Carrier plates are welded to the treads by two welds at each end for durability.

Copyright 1976, United States Gypsum Company

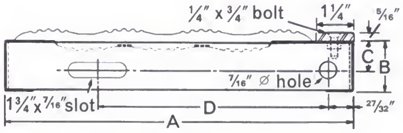
standard stair tread

The distinctive tread edge of GRIP STRUT Grating is easily seen so it's easy to see where to step. Makes a clear visual break between treads without added nosing. Workmen can walk with confidence —and security.



abrasive nosing stair tread

GRIP STRUT Safety Grating Stair Tread is available with abrasive nosing.



stair tread requirements

can usually be met economically with one of the four standard lengths. Each length is available in 2-, 3-, 4-, or 5-diamond tread depth. Gauges and channel heights are available for any design load you require. All are attractively priced.

technical data

DIMENSIONS — STEEL AND ALUMINUM

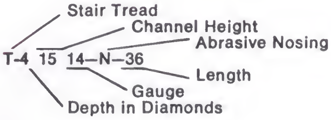
STANDARD				WITH ABRASIVE NOSING			
A	B	C	D	A	B	C	D
4¾″	1½″	¾″	—	—	—	—	—
(2-dia.)	2″	1″					
7″	1½″	¾″	3⅜″	8⅛″	1½″	¾″	4½″
(3-dia.)	2″	1″	3⅜″	(3-dia.)	2″	1″	4½″
9½″	1½″	¾″	5⅞″	10½″	1½″	¾″	6⅞″
(4-dia.)	2″	1″	5⅞″	(4-dia.)	2″	1″	6⅞″
11¾″	1½″	¾″	8⅛″	—	—	—	—
(5-dia.)	2″	1″	8⅛″				

LENGTHS:
STANDARD LENGTHS ARE:
24″, 30″, 36″, 48″
OTHER LENGTHS AVAILABLE

MATERIALS:
STEEL: PRE-GALVANIZED
(ASTM A-525)
BLACK, UNPAINTED
ALUMINUM: MILL FINISH
STAINLESS STEEL: MAKE INQUIRY

TOLERANCES:
WIDTH: STANDARD, AS SHOWN
LENGTH: ±⅛″
HEIGHT: STANDARD, AS SHOWN
DIMENSIONS A, B, C, & D HAVE A TOLERANCE ±1/16″

CATALOG DESCRIPTION
EXAMPLE:



Add "IS" after gauge for non-serrated
Add "A" in place of gauge if aluminum

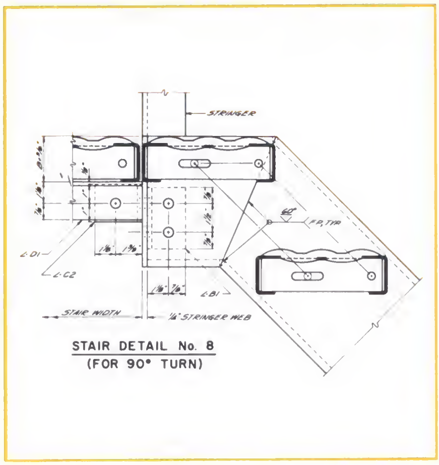
exclusive GRIP STRUT Safety Grating Stair Tread Standard System reduces work and cost every step of the way

free! GRIP STRUT Safety Stair Tread standard system drawings

Here is a time-saving *systems* approach for efficient, economical staircase design and construction. U.S.G. commissioned a registered professional engineering firm to prepare all the technical information you need in *one source.* The result is GRIP STRUT Safety Grating Stair Tread Standard System Drawings.

No more laborious coordinating of data from several sources . . . no more time-consuming calculation of angles, runs, and rises. You have simplified, reproducible drawings and a pre-engineered *bolt-up* system for easier, quicker erection.

Now you can construct staircases on-site with locally available materials from designs that comply with the requirements of major building codes. Take the systems approach—specify GRIP STRUT Safety Stair Treads in your next expansion or replacement job.



Typical drawing. Actual size is 24" x 36" for easy readability.

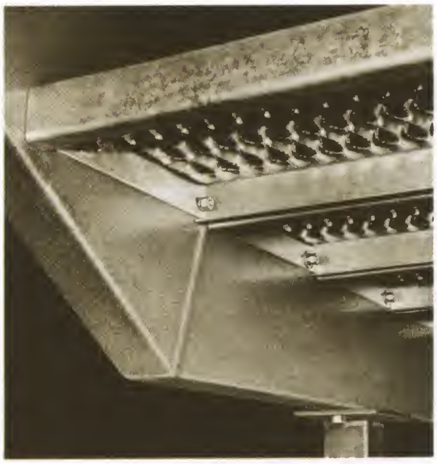
☐ Show how to engineer single and multiple flight installations.

☐ Pitch Angle Charts help you choose the angle best for appearance, safety, and stepping comfort.

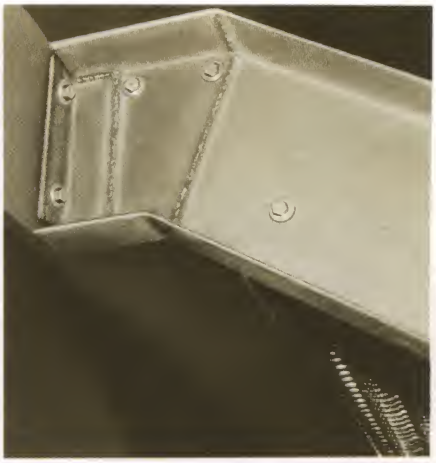
☐ Many other aids to fast, low-cost staircase construction.

☐ Available from your local GRIP STRUT distributor or by contacting U.S.G. Metal Products Division.

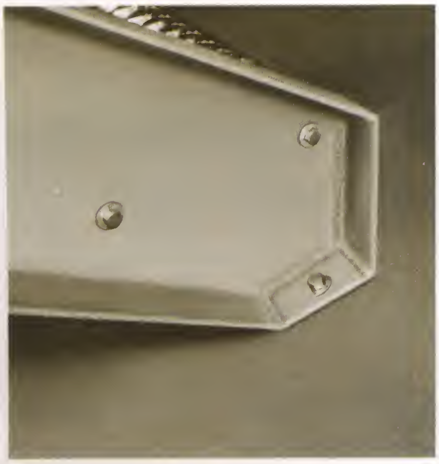
construct staircases in less time with this new, pre-engineered, bolt-up system



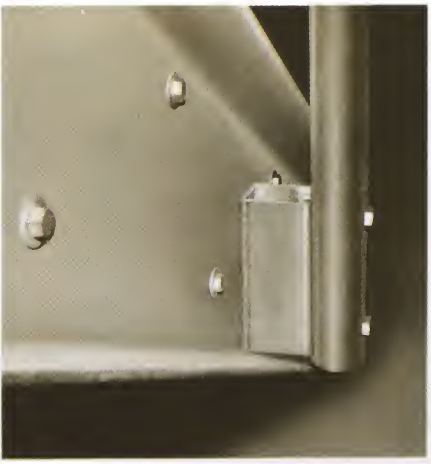
Standard GRIP STRUT Stair Treads in place to form landing. Rectangular column supports stringer.



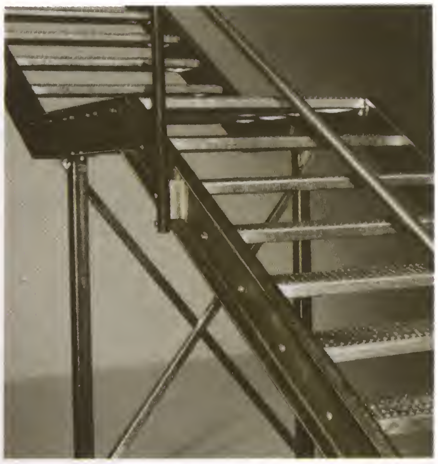
Stringer bolted solidly to top support.



Stringer firmly anchored to floor by bolts.



Bolted handrail attachment.



Complete—in less time with less work using less structural material.

design data

Use this easy way to determine:—Number of treads needed
—Angle of staircase
—Total floor-to-floor rise
—Total floor space required

for 6″ rise

No. Treads Required	Floor to Floor Rise (inches)	Approximate Floor Space Required		
		3-diamond 7″ Tread Stair ∠ = 45°	4-diamond 9½″ Tread Stair ∠ = 35°	5-diamond 11¾″ Tread Stair ∠ = 29°
2	12	14	19	23
3	18	20	27	34
4	24	26	36	45
5	30	32	44	56
6	36	38	53	66
7	42	44	61	77
8	48	50	70	88
9	54	56	78	99
10	60	62	87	109
11	66	68	95	120
12	72	74	104	131
13	78	80	112	142
14	84	86	121	152

for 6.5″ rise

No. Treads Required	Floor to Floor Rise (inches)	Approximate Floor Space Required		
		3-diamond 7″ Tread Stair ∠ = 47°	4-diamond 9½″ Tread Stair ∠ = 37°	5-diamond 11¾″ Tread Stair ∠ = 31°
2	13	14	19	23
3	19.5	20	27	34
4	26	26	36	45
5	32.5	32	44	56
6	39	38	53	66
7	45.5	44	61	77
8	52	50	70	88
9	58.5	56	78	99
10	65	62	87	109
11	71.5	68	95	120
12	78	74	104	131
13	84.5	80	112	142
14	91	86	121	152

for 7″ rise

No. Treads Required	Floor to Floor Rise (inches)	Approximate Floor Space Required		
		3-diamond 7″ Tread Stair ∠ = 49°	4-diamond 9½″ Tread Stair ∠ = 39°	5-diamond 11¾″ Tread Stair ∠ = 33°
2	14	14	19	23
3	21	20	27	34
4	28	26	36	45
5	35	32	44	56
6	42	38	53	66
7	49	44	61	77
8	56	50	70	88
9	63	56	78	99
10	70	62	87	109
11	77	68	95	120
12	84	74	104	131
13	91	80	112	142
14	98	86	121	152

for 7.5″ rise

No. Treads Required	Floor to Floor Rise (inches)	Approximate Floor Space Required		
		3-diamond 7″ Tread Stair ∠ = 51°	4-diamond 9½″ Tread Stair ∠ = 41°	5-diamond 11¾″ Tread Stair ∠ = 35°
2	15	14	19	23
3	22.5	20	27	34
4	30	26	36	45
5	37.5	32	44	56
6	45	38	53	66
7	52.5	44	61	77
8	60	50	70	88
9	67.5	56	78	99
10	75	62	87	109
11	82.5	68	95	120
12	90	74	104	131
13	97.5	80	112	142
14	105	86	121	152

for 8″ rise

No. Treads Required	Floor to Floor Rise (inches)	Approximate Floor Space Required		
		3-diamond 7″ Tread Stair ∠ = 53°	4-diamond 9½″ Tread Stair ∠ = 43°	5-diamond 11¾″ Tread Stair ∠ = 37°
2	16	14	19	23
3	24	20	27	34
4	32	26	36	45
5	40	32	44	56
6	48	38	53	66
7	56	44	61	77
8	64	50	70	88
9	72	56	78	99
10	80	62	87	109
11	88	68	95	120
12	96	74	104	131
13	104	80	112	142
14	112	86	121	152

for 8.5″ rise

No. Treads Required	Floor to Floor Rise (inches)	Approximate Floor Space Required		
		3-diamond 7″ Tread Stair ∠ = 55°	4-diamond 9½″ Tread Stair ∠ = 45°	5-diamond 11¾″ Tread Stair ∠ = 38°
2	17	14	19	25
3	25.5	20	27	34
4	34	26	36	45
5	42.5	32	44	56
6	51	38	53	66
7	59.5	44	61	77
8	68	50	70	88
9	76.5	56	78	99
10	85	62	87	109
11	93.5	68	95	120
12	102	74	104	131
13	110.5	80	112	142
14	119	86	121	152

stair tread loading

load data below takes eccentric loads into consideration. Although load values include allowances for normal impact conditions and usual pedestrian traffic, be sure to make provisions in the structural design for special uses and loads involving unusual impact forces or vibratory forces.

load-carrying capacity of stair treads increases as side channel height and gauge of material increase.

☐ Most of the force imposed on stair treads by pedestrian traffic is applied to the leading edge of the treads.

☐ Tests indicate that a man imposes no more than twice his weight on a stair tread due to the physical limitations of muscular joint strength.

☐ One man on a single tread tends to approximate a concentrated load whereas two men on a single tread tend to approximate a uniformly distributed load.

☐ Many stair tread manufacturers publish load data for material tested as a simple beam, but not as stair treads. The GRIP STRUT Safety Grating Catalog G-60 shows ordinary simple beam load tables.

safe loading table

steel treads exceed concentrated live load capacity and uniform live load capacity required by major building codes (min. 100 psf uniform, 300 lbs. concentrated at tread center).

aluminum treads exceed uniform live load capacity required by major building codes. They are not recommended for widths greater than 36 in.

load values shown on gray background exceed building code requirements by 100%.

load values shown on color background exceed building code requirements by 300%.

load values shown on white background exceed building code minimum requirements.

U-Uniform Load (lbs./sq. ft.) C-Concentrated Load (lbs.)		2-diamond 4¾″ depth						3-diamond 7″ depth						4-diamond 9½″ depth						5-diamond 11¾″ depth					
MATERIAL		**STEEL**		**STEEL**		**ALUM.**		**STEEL**		**STEEL**		**ALUM.**		**STEEL**		**STEEL**		**ALUM.**		**STEEL**		**STEEL**		**ALUM.**	
GAUGE		14		12		.080″		14		12		.080″		14		12		.080″		14		12		.080″	
SPAN	**SIDE CHAN.**	**C**	**U**	**C**	**U**	**C**	**U**	**C**	**U**	**C**	**U**	**C**	**U**	**C**	**U**	**C**	**U**	**C**	**U**	**C**	**U**	**C**	**U**	**C**	**U**
2′0″	1½″	472	1191	624	1576	—	—	443	761	587	1006	—	—	435	549	595	750	—	—	425	434	563	575	—	—
	2″	783	1978	995	2513	243	614	737	1262	936	1604	228	392	604	911	917	1158	224	282	573	721	897	916	197	224
2′6″	1½″	378	764	500	1011	—	—	356	488	470	645	—	—	349	353	476	481	—	—	342	278	452	369	—	—
	2″	611	1268	797	1611	194	393	590	810	750	1029	183	251	578	584	734	742	179	181	566	463	719	587	176	143
3′0″	1½″	315	532	418	703	—	—	300	340	393	450	—	—	300	245	398	335	—	—	300	194	378	258	—	—
	2″	524	882	665	1121	162	273	492	563	626	716	152	174	483	407	614	517	150	126	473	322	601	409	147	100
4′0″*	2″	394	498	501	633	—	—	372	318	472	404	—	—	364	230	463	292	—	—	356	182	454	232	—	—

*Intermediate stringer is recommended for spans over 4′.

code requirements

Although complete information on design and construction of stairs and stair systems exists, it cannot be found in any single source. To help you in your staircase planning, U.S.G. has compiled the following information from several engineering manuals and code books currently used.

National Building Code, Southern Standard Building Code, and Building Officials Conference of America concur on the following design standards.

load capacity
Design exterior and interior stairways to carry a minimum of 100 lbs. per sq. ft., live load uniformly distributed, or to carry 300 lbs. concentrated on the center of the tread. This makes adequate allowances for ordinary impact conditions on live loads. Provide in the structural design for special uses and loads which involve unusual vibration and impact forces.[1]

slope
Design staircases between 20 and 50 degrees in slope for comfort and safety; however, the preferred range is between 30 and 45 degrees. Refer to Quick Reference Chart on page 6 for Design Data. This chart highlights available selection of treads, run and rise dimensions for desired slope. Code data covers stairway slope range of from 20 to 50 degrees, stepladder range of from 50 to 70 degrees and straight ladder range of from 70 and 90 degrees.[2]

Occupational Safety and Health Act standards require fixed stairs to be installed at angles to the horizontal of between 30 and 50 degrees.

OSHA Standards give the range of 75 to 90 degrees to horizontal as the preferred pitch for fixed ladders. Substandard pitches in the range of 60 to 75 degrees are permitted only where necessary to meet conditions of installation and should be avoided wherever possible.

run and rise
Fix, at will, the run or total floor space occupied by staircase within the limitations of available space and comfortable slope.

The most desirable situation is when the sum of the depth of one tread and the height of one riser equals from 17 to 17½ in.

Allow no more than 15 risers in a single flight for comfort and safety. Use an intermediate landing if the staircase requires more than 14 treads.[3]

handrail heights[4]
measured perpendicular to the top of the tread:

Ramps	39″
6″ Riser	32″
7″ Riser	33″
8″ Riser	34″
Ship's ladder	33″

staircase width

A minimum width of 22 in. accommodates one person. The total width of a staircase should be in approximate multiples of this 22-in. unit. Three feet is the desirable minimum for exit stairways. If emergency evacuation criteria are essential, reliable engineering sources recommend that stairs be constructed so that 45 persons can descend per 22-in. width in one minute. Up to 66 in. wide, a handrail at each side of the staircase is acceptable. Staircases wider than 66 in. should have a handrail in the middle.[5]

landings and platforms

The least dimension of landings and platforms should not be less than the required width of stairway.[6]
A minimum of 30 in. in the direction of travel is desired.

ramps

Ramps with a gradient of not more than 1 in 10 may be substituted for stairs. Ramps used in place of stairs but constructed and enclosed as required for the stairway thus displaced. Ramps used in exits should slope not to exceed one foot in 10 feet and should be provided with a slip-proof surface.[7]

catwalks

Accepted standards for catwalks have been established by U.S. Army Corps of Engineers.

Design, construct and maintain all temporary trestles, ramps, scaffolds, and similar load-bearing structures with a safety factor of not less than 4. Load-carrying capacity with a safety factor of 4, as required by codes, can be obtained by dividing by 2 the load values shown in GRIP STRUT Safety Grating Catalog G-60.

Keep scaffolds, platforms, runways, floors, etc., free of ice, snow, grease, mud, or any other material or equipment, which render them unsafe or hazardous.

Use slip-resistant material to assure safe footing where walkways and work surfaces are slippery. The serrated surface of GRIP STRUT Safety Grating meets Federal Specifications RR-G-1602 for slip resistance and helps meet OSHA Standards for stair treads.

Determine the width of all scaffolds, ramps, runways and platforms according to their purpose, but in no case should they be less than 18 in. Provide sufficient width to avoid congestion of men, materials or equipment and to provide unobstructed passage appropriate to work function.[8]

Consult local codes for information relating to design and construction of stair treads and staircases.

---

[1] National Building Code-1955; Section 902.4
Southern Standard Building Code-1965; Section 1203
Building Officials Conference of America—4th edition 1965; Section 707-709

[2] Architectural Graphic Standards—6th edition;

[3] Baumeister, Theodore, Mark's Mechanical Engineers Handbook—6th edition; page 12-11

[4] Corps of Engineers, Safety General Requirements—Em 355-1-1; page 138

[5] Baumeister, Theodore, Mark's Mechanical Engineers Handbook—6th edition, page 12-11

[6] op. cit.
BOCA section 618.31

[7] op. cit.
NBC section 607
SSBC section 1118
BOCA section 617.0

[8] Corps of Engineers Safety General Requirements—EM 385-1-1; page 138 sections 22.A.01 through 22.A.07

specifications

scope of application

GRIP STRUT Safety Grating Stair Treads are intended for general purpose use in plants and process facilities by industry, commerce, and public utilities, and on air, water, and surface mobile and stationary equipment.

The unique safety features and open design of GRIP STRUT Safety Grating Stair Treads make them particularly appropriate wherever slip-inducing substances are present due to manufacturing, processing, movement of materials or atmospheric conditions.

GRIP STRUT Stair Treads are intended for utility stairs and fire escapes in commercial, public and private buildings where local codes permit. They are not intended for staircases used regularly by the general public where flat closed surfaces are desired.

sample specifications

Stair treads shall be GRIP STRUT Safety Grating or GRIP STRUT Non-serrated Grating as manufactured by *Metal Products Division, United States Gypsum Company*. Treads shall be manufactured from 12 or 14-ga. hot dip mill-galvanized steel; unpainted steel; 5052-0 type aluminum—.080 thickness; 16-gauge, type 304 stainless steel; length, diamond pattern, and channel height as shown on drawings.

safety specification

Stair Treads shall be GRIP STRUT Safety Grating Stair Treads as manufactured by *Metal Products Division, United States Gypsum Company;* made from material as described and listed by Underwriters Laboratories Inc., for slip resistance and shall comply with Federal Specification RR-G-1602 for slip resistance.

complete stair system specification

Stair system shall be as shown on drawings as designed for *Metal Products Division, United States Gypsum Company,* for use with GRIP STRUT Safety Grating Stair Treads.

GRIP STRUT Safety Grating for catwalks and ramps

Tripping over debris . . . slipping on wet, icy, oily, or greasy surfaces. These are the causes of many accidents on ramps and catwalks. GRIP STRUT is today's *safest* walking-working surface—under all conditions—in all directions because of the greater slip resistance provided by the unique serrated surface.

The open design allows fluids and other slip-inducing materials to pass through easily for safer, non-slip scaffolds, walkways, ramps and platforms.

The result: fewer accidents, greater production, and often, lower insurance expense due to improved safety records.

Modular widths of GRIP STRUT Grating provide walkway widths and load-carrying capacity required by codes.

Self-framing integral side channels permit long spans with a minimum of structural materials.

10-diamond GRIP STRUT satisfies the width requirements of the U. S. Corps of Engineers for walkways with a single self-framing piece.

High strength-to-weight ratio; most planks can be handled by one man. GRIP STRUT Safety Grating is listed by Underwriters Laboratories Inc., for slip resistance only.

GRIP STRUT Safety Grating was tested by an independent laboratory for slip resistance according to standards and methods established by Federal Specification RR-G-1602.

Consult the GRIP STRUT Safety Stair Tread Standard System Drawings for pre-engineered ramps and walkways.

applications

☐ Platforms, ramps and catwalks in commercial, public and private buildings where codes permit.

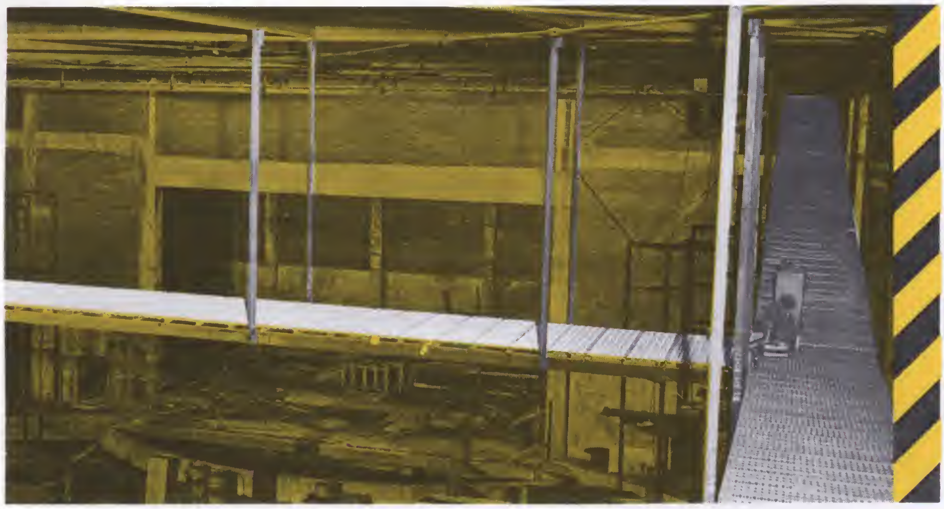
☐ *General purpose use* in plants, process facilities, public utilities.

☐ Steps, platforms and catwalks for mobile and stationary equipment on land, air or water.

☐ *Wherever slip-inducing substances are present* due to manufacturing, processing, movement of materials or atmospheric conditions.

☐ *Not intended* for use by general public where flat closed surfaces are desired.

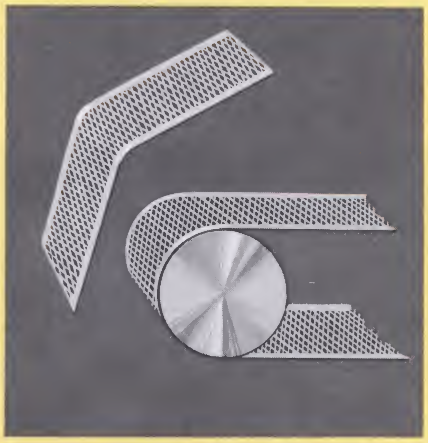
For applications requiring greater load-carrying capacities or special products, consult U.S.G. or your local GRIP STRUT Safety Grating distributor.



GRIP STRUT Safety Grating offers a wide range of materials, sizes, types, and special shapes to meet requirements of function and design.

GRIP STRUT Safety Grating combines safety and durability with ease of fabrication and versatility. One piece construction—no welds or rivets to fail. Special shapes are offered to reduce need for plant fabrication. Special forming can be accomplished to suit requirements not covered by the standard products.

It's simple and economical to apply finish coatings because all surfaces are accessible to brush or spray. GRIP STRUT may be hot-dip galvanized after fabrication, anodized, plated, plastic-coated or otherwise finished to suit special job requirements.



GRIP STRUT Grating may be formed longitudinally to a 3-in. radius.

how to order

GRIP STRUT Grating and Stair Treads are stocked in over 75 locations in the United States. For the finest in Safety Grating and Stair Treads, contact U.S.G. Metal Products Division or look for your local GRIP STRUT distributor in the Yellow Pages under "Grating." You'll get skilled consulting service on your specific requirements.

Specify GRIP STRUT Safety Stair Treads by:

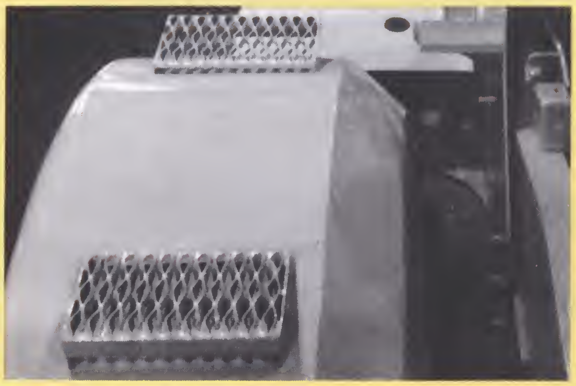
TREAD DEPTH—(2-diamond 4¾″ wide) (3-diamond 7″ wide) (4-diamond 9½″ wide) (5-diamond 11¾″ wide)

CHANNEL HEIGHT—1.5″, 2.0″

GAUGE (14-ga. or 12-ga. steel) (16-ga. stainless) (.080 aluminum)

LENGTH in inches. (Width of staircase) (Standard lengths recommended are 24″, 30″, 36″, 48″)

MATERIAL (steel pre-galvanized) (steel black unpainted) (aluminum mill finish) (stainless steel)



VEHICLE SAFETY STEPS

LADDERS AND PLATFORMS

METAL PRODUCTS DIVISION
UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

Printed in U.S.A.

TOP-RATED SOUND CONTROL

...the ultimate insulation for fire safety

Thermafiber® SOUND ATTENUATION BLANKETS

Looking for effective "Sound Walls"?
Searching for options in quiet-rated systems?
Shopping for extra value for your dollar?

It's all yours with THERMAFIBER Sound Attenuation Blankets. A highly effective sound-stopper... fire-fighter . . . budget-helper. THERMAFIBER Sound Attenuation Blankets are incorporated in specific assemblies that meet the fire and sound performance requirements of building codes. Substitution of materials in a U.S.G.-tested assembly could result in failure of the system under critical conditions of sound or fire exposure and nullify certification performance. Plan now to capitalize on these major advantages:

- **Large selection** of rated-performance partition and ceiling systems—up to 60 STC; wood-frame, steel-frame or solid-gypsum types; drywall or plaster finish
- **Greater fire resistance** than glass-fiber blankets, which melt at approximately 1,000°F. lower temperature than THERMAFIBER Sound Attenuation Blankets
- **Higher-density structure** than glass fiber blankets. Just looking at both reveals the difference!
- **Semi-rigid form**—easy handling, fast installing
- **Greater tenant satisfaction,** less turnover—highly effective sound absorption and attenuation are provided by THERMAFIBER Blankets
- **Unit responsibility**—test certification and full-rated performance backed by United States Gypsum when all products and installation used are in accordance with U.S.G.-published specifications

UNITED STATES GYPSUM
1975-6
9P GYPSUM WALLBOARD
sound insulation

technical data

THERMAFIBER Sound Attenuation Blankets are paperless, semi-rigid, spun mineral-fiber mats which substantially improve sound attenuation of interior partitions and ceilings.

Available in 1" (4.0 pcf density), 1½" (3.0 pcf) and 2" (2.5 pcf) thicknesses; 24" width; 48" length. Fire hazard classification: flame spread 15, fuel contributed 0, smoke developed 0. Meet Federal Spec. HH-I-521E, Type I.

application directions

Cutting—Use a serrated-blade knife for quick, clean, accurate cutting of blankets.

Stapling—Staple each section of blanket to the cavity side of the base layer using five 9⁄16"-long staples for each piece. Drive one staple in the center and a staple at each corner, approx. 3" from edges. Use a trigger stapler, or power stapler S-6532 as manufactured by Fastener Corp., and install by one of the following methods:

1. Press a wallboard nail flat against the blanket, straddle nail with a staple and drive staple through blanket and into the base layer.
2. Press a 1½" length of PERF-A-TAPE* Reinforcing Tape or equivalent against back of blanket and drive a staple through tape and blanket, and into the base layer.

Fitting—Take care to fill all voids. Butt ends of blankets closely together. Fit blankets carefully behind electrical outlets, bracing, fixture attachments, medicine cabinets, etc. Design considerations should allow for an air space between blanket and back surface of the opposite base layer.

For ceiling application, simply lay the blankets on the ceiling surface; no fastening is necessary.

NOTE: All products described here may not be available in all geographic markets. For technical data on specific assemblies, refer to U.S.G. folder SA-705, Sec. 7.14 of Sweet's Architectural Catalog File, or consult your local U.S.G. sales office or representative for information.

U.S.G. DIVISION SALES OFFICES: Tarrytown, N.Y. (914) 332-0800; Altanta, Ga. (404) 393-0770; Chicago, Ill. (312) 321-4100; Los Angeles, Calif. (213) 388-1171; Tacoma, Wash. (206) 922-8756.

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BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

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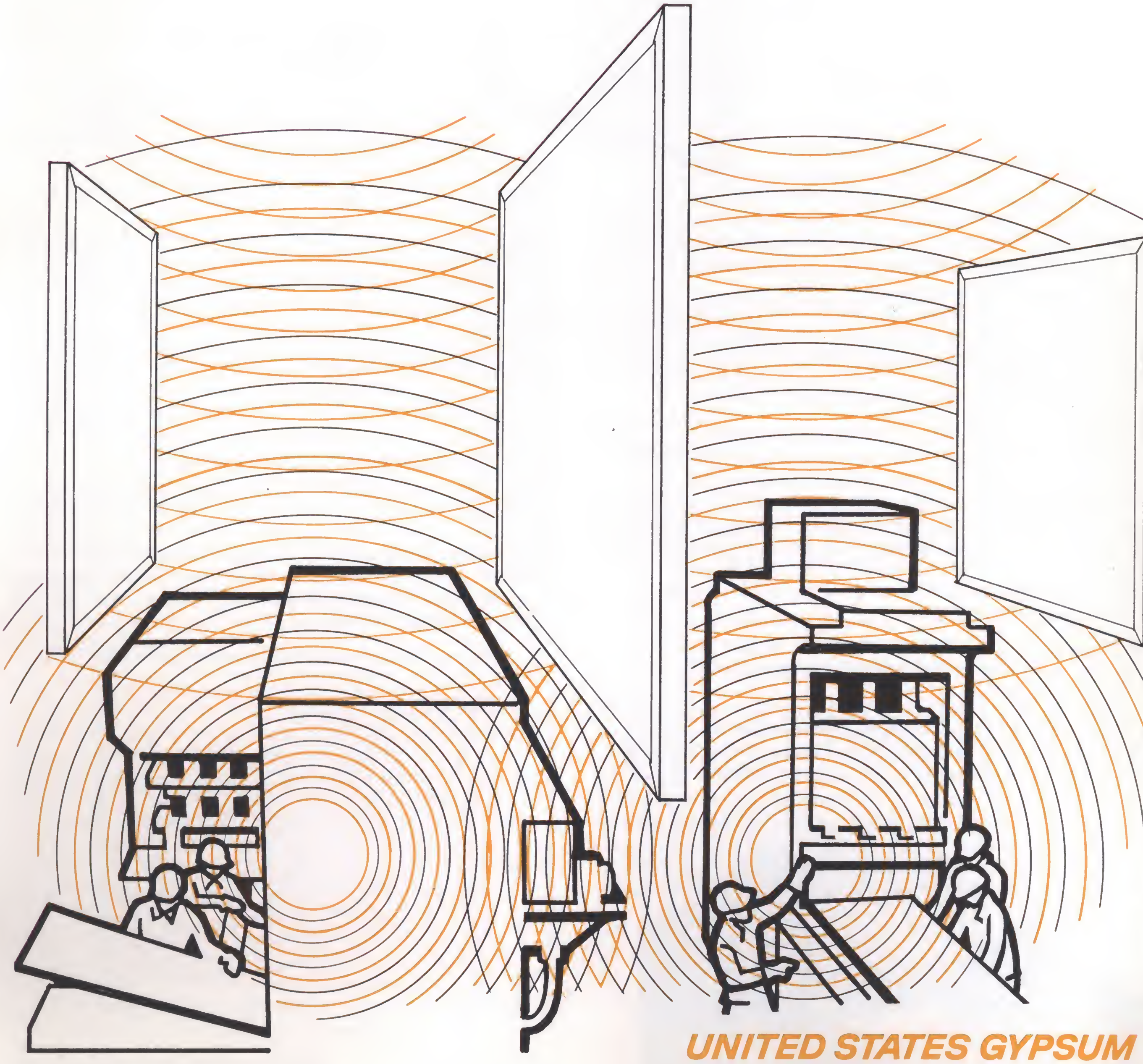
ACOUSTISORBER

acoustical space units

—reduce reflected sound waves
—stop sound level build-up
—improve industrial environment



UNITED STATES GYPSUM

UNITED STATES GYPSUM
1974—1

9P

ACOUSTICAL TREATMENT
sound absorber

ACOUSTISORBER

space units . . . suspended industrial sound absorbers

. . . mineral fiber pads, metal-framed and plastic-enclosed, designed to hang overhead for economical, effective noise control in industrial plants.

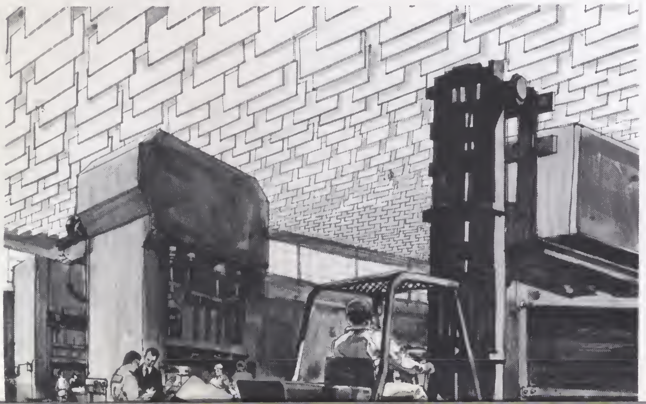
High performance, low cost and spartan simplicity are hallmarks of this new dimension in industrial sound control. Measuring 24x20 in. in size and 1 in. thick‡, ACOUSTISORBER Space Units absorb 50% more reflected sound energy than 3⅓ sq. ft., the equivalent area, of high-efficiency acoustical tile installed on a conventional suspended grid system. They consist simply of mineral fiber pads protected on all edges by a metal frame containing pre-punched suspension hooks, and fully encased in white polyvinyl-chloride plastic film.

Basic comparisons show the exceptional efficiency of ACOUSTISORBER Space Units. Painted concrete block walls used in many industrial plants have a sound absorption coefficient of only .07 at 1000 Hz. Concrete floors have a coefficient of .02—steel roof decks .04. (One sq. ft. of a totally absorptive surface would have a coefficient of 1.0.) *Because both sides are exposed to absorb sound energy,* ACOUSTISORBER Units have a coefficient of 1.5 for each sq. ft. of unit. Hence, they offer a highly effective means of introducing needed sound absorption into an industrial environment where absorption is not provided by conventional construction materials.

ACOUSTISORBER Units, quickly installed along easily placed wire hangers, can provide needed sound absorption where other means of reducing plant noise are prohibitively expensive. Moreover, spacing is not critical —an irregular placement of the needed number of Space Units along each suspension wire performs efficiently. Space Units can be suspended between and around existing installations such as ventilation, light fixtures and other overhead utilities.

In addition, high reflectivity of the white plastic film is a bonus feature that can add to brightness levels throughout treated areas.

fire hazard classification: flame spread 0, fuel contributed 15, smoke developed 5. Tested in accordance with ASTM E84 by Southwest Research Institute.



limitations

ACOUSTISORBER Space Units are designed only to reduce the level of reverberant sound energy; they will not reduce the level of direct sound from source to listener.

ACOUSTISORBER Units are not recommended as the sole means of obtaining sound level reductions greater than 7 db; additional treatment such as vibration-damping mountings, machine balancing and tuning, and/or sound-isolating partitions is required.

ACOUSTISORBER Space Units must be located so that they do not interfere with fire-protection sprinklers. They are not recommended for use where temperature exceeds 150°F.

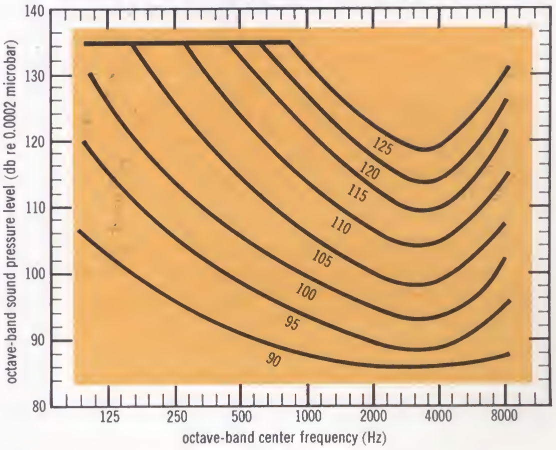
protection for workers as required by law

The Occupational Safety and Health Act of 1970 states, in part, "Protection against the effects of noise exposure shall be provided when the sound levels exceed those shown . . . when measured on the 'A' scale of a standard sound-level meter at slow response."

This provision of the act is directed toward human reaction to sound rather than sound as a physical phenomenon. Sound-pressure level, for instance, cannot be taken at face value as an indication of loudness because the frequency (or pitch) of a sound has much to do with how loud it sounds. Thus, sound-level meters are designed with "weighting networks"—one of which is measured on the "A" scale—enabling the meter to discriminate against low frequencies to about the same degree as does the human ear. Sound-level decibels measured on the "A" scale are represented by the symbol "dbA."

When noise levels are found by octave-band analysis, equivalent A-weighted sound level may be found using the chart below. The A-weighted sound level is point of highest penetration into sound level contours for any octave-band sound pressure level and center frequency. This equivalent A-weighted sound level is then used to find noise exposure limits.

contours for determining equivalent A-weighted sound level



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‡Nominal dimensions

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noise level can limit employee work hours

How much noise endangers hearing is still a matter of research. However, the Safety and Health Act clearly defines what are considered safe-exposure noise limits. Basically, industrial workers are allowed to work only to the following noise exposure limits:

Exposure Per Day (Hrs.)	Sound Level (dbA)	Exposure Per Day (Hrs.)	Sound Level (dbA)
8	90	1½	102
6	92	1	105
4	95	½	110
3	97	¼ or less	115
2	100		

These limits govern total permissible noise exposure during a working day, whether exposure is continuous or intermittent. In addition, where exposure involves noise at different levels of intensity for separate periods of time, the combined effect must be calculated to determine compliance under the law. The safe limit for exposure to noise at different levels can be expressed as follows:

$$\frac{E_1}{L_1} + \frac{E_2}{L_2} + \ldots \frac{E_n}{L_n} \leq 1$$

where E represents duration of exposure at a given noise level, and L represents maximum safe duration at the same level.

For example:
A worker is exposed to a noise level of 90 dbA for 3 hrs., to 92 dbA for 1 hr., and to 100 dbA for 1 hr.

Using the table . . .

$\frac{3}{8} + \frac{1}{6} + \frac{1}{2} = \frac{25}{24} > 1$, so total combined exposure exceeds the permissible limit for a single working day.

If this example represented an actual case, the worker's employer would have only two available options:
(1) Reduce the worker's already short working day, or
(2) Reduce plant noise level to within conformance limits—preferably to 90 dbA, which allows an 8-hr. working day.

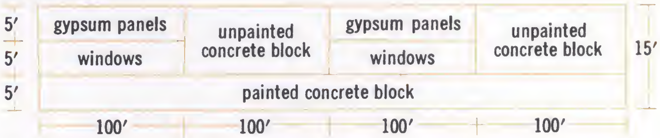
How to reduce noise to acceptable limits depends upon the nature of the noise. Most often the problem involves reverberant sound energy. Sound emitted from machines strikes reflective surfaces and reverberates until the build-up reaches high and sometimes hazardous levels. Equilibrium is reached only when noise emitted by the source equals that being lost through the walls, ceiling and floor (transmission) and soaked up by the same surfaces (absorption). Solving this sort of noise problem is the special province of ACOUSTISORBER Space Units.

estimating data

how many ACOUSTISORBERS needed?

Solution of a specific noise problem is best illustrated by example. The hypothetical plant is 100x100x15 ft. with the following physical characteristics:

Wall Construction



Ceiling construction—steel roof deck on steel joists
Floor construction—concrete
Plant workers—61 adults

High-speed machining operations in this plant produce the following sound pressure level spectrum:

Sound Pressure Level Spectrum

frequency (Hz)	125	250	500	1000	2000	4000	8000
sound pressure level (db)	88	88	86	92	92	87	78

Using the graph on page 2 as directed, the equivalent A-weighted sound level of the spectrum is 97 dbA (found at 2,000 Hz—the deepest point of penetration).

First step in solving the problem is to find the necessary sound pressure level reduction in each octave band to meet an equivalent 90 dbA sound level. The following reductions are obtained from the graph, page 2.

Required Sound Pressure Level Reduction

frequency (Hz)	125	250	500	1000	2000	4000	8000
sound pressure level (db)	0	0	0	5	6	1	0

Second step is to determine the sound absorption (sabins) present in the plant. This can be solved mathematically using the following formula:

$$A = \frac{0.05V}{T}$$

where: A = absorption in sabins
V = volume of plant in cubic feet
T = reverberation time in seconds

However, reverberation time is not determined as easily as sound pressure level. The nature of the test forces regular plant operations to be halted while measurements are made. This requirement usually results in existing absorption being estimated using known values for various materials (see back page) present in the plant. Since noise reduction is required in three octave bands, existing absorption must be calculated in these bands (1,000, 2,000, 4,000 Hz). Estimated existing absorption values, shown in the table below, are calculated using this formula:

area x absorption coefficient = absorption (sabins)

Estimated Existing Absorption (sabins)

item and quantity	1,000 Hz	2,000 Hz	4,000 Hz
1,000 sq. ft. gypsum panels	40	70	90
1,000 sq. ft. windows	120	70	40
2,000 sq. ft. unpainted concrete block	580	780	500
2,000 sq. ft. painted concrete block	140	180	160
10,000 sq. ft. steel roof deck	400	400	400
10,000 sq. ft. concrete floor	200	200	200
61 adult workers	280	305	305
150,000 cu. ft. air at 50% RH	165	435	1,110
Total existing absorption	1,925	2,440	2,805

Third step employs a calculation to find the absorption needed to achieve the required noise reduction. The following formula is used in this solution:

$$A_2 = A_1 \text{ antilog} \left(\frac{NR}{10}\right)$$

where: A_2 = absorption in sabins after treatment of space
A_1 = absorption in sabins before treatment of space
antilog = common antilogarithm
NR = desired noise reduction in db

Solving the equation for each octave-band noise reduction gives the total absorption required. The additional absorption needed is the absorption required less the existing absorption as shown in the table below.

Additional Absorption Needed (sabins)

item	1,000 Hz	2,000 Hz	4,000 Hz
total absorption required	6,087	9,713	3,531
existing absorption	1,925	2,440	2,805
additional absorption needed	4,162	7,273	726

To convert needed absorption into ACOUSTISORBER Space Units, see the following absorption characteristics table.

frequency (Hz)	125	250	500	1000	2000	4000
absorption per unit (sabins)	0.7	1.7	3.2	5.0	5.3	3.9

As tested by Riverbank Acoustical Laboratories (test no. A-72-90) with units spaced 1 ft. apart in rows 3 ft. o.c.

The solution (for the critical requirement at 2,000 Hz.):

$$\frac{7{,}273 \text{ sabins}}{5.3 \text{ sabins per unit}} = 1{,}372 \text{ units}$$

$$\text{or } \frac{10{,}000}{1{,}372} \text{ sq. ft.} = 1 \text{ unit per } 7.3 \text{ sq. ft. (approx.)}$$

Therefore, *the desired 7 dbA noise reduction* is accomplished with 1,372 ACOUSTISORBER Space Units, suspended along their 24-in. sides on 39 pre-hung wires spaced 30 in. o.c.—35 units on 32 of the wires, 36 on the remaining 7.

This general solution applies to typical basic plant situations. For more complex noise problems and applications, an acoustical consultant should be contacted.

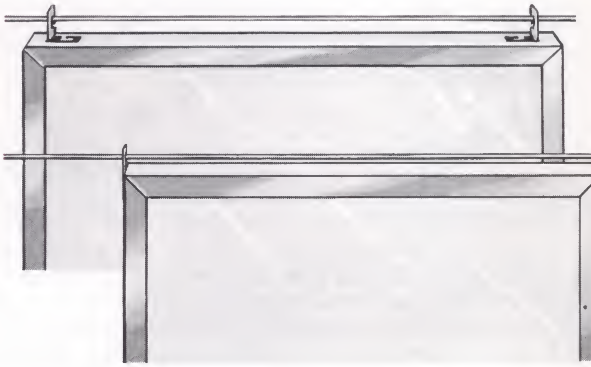
This hypothetical case, which required a 7 dbA noise level reduction, does not represent an unusual problem. All of the following types of industrial equipment generate noise levels in the danger zone above 90 db. These are only a few of the hazardous noise producers, but wherever equipment of this sort is used, ACOUSTISORBER Space Units can help substantially in reducing noise to safe limits.

sound absorption coefficients

Materials	Coefficients (sabins per sq. ft. except as noted)					
Frequency (Hz)	125	250	500	1000	2000	4000
Brick, unglazed	.03	.03	.03	.04	.05	.07
Brick, unglazed, painted	.01	.01	.02	.02	.02	.03
Concrete Block, coarse	.36	.44	.31	.29	.39	.25
Concrete Block, painted	.10	.05	.06	.07	.09	.08
Floors						
Concrete or terrazzo	.01	.01	.015	.02	.02	.02
Linoleum, asphalt, rubber or cork tile on concrete	.02	.03	.03	.03	.03	.02
Wood	.15	.11	.10	.07	.06	.07
Glass						
Large panes of heavy plate glass	.18	.06	.04	.03	.02	.02
Ordinary window glass	.35	.25	.18	.12	.07	.04
Gypsum Panels ½" thick, nailed to 2x4s 16" o.c.	.29	.10	.05	.04	.07	.09
Glazed Tile	.01	.01	.01	.01	.02	.02
Plaster, gypsum or lime, smooth finish on tile, brick or block	.013	.015	.03	.02	.04	.05
Plaster, gypsum or lime, rough finish on lath	.02	.03	.04	.05	.04	.03
Same, with smooth finish	.02	.02	.03	.04	.04	.03
Steel Roof Deck				.04	.04	.04
Person, Adult, each	2.5	3.5	4.2	4.6	5.0	5.0
Air per 1,000 cu. ft. at 50% RH	.09	.20	.50	1.1	2.9	7.4

installation directions

Suspend ACOUSTISORBER Space Units from pre-hung parallel wires installed at the desired height and attached to structural members. Suspend units from 20-in. side for vertical installation, from 24-in. side for horizontal installation. Compute gauge of wire and length of spans to support the necessary number of 2½-lb. ACOUSTISORBER Units.



Raise pre-punched hooks on edge of unit to vertical position and hook over suspension wire. Bend tabs in such a manner that accidental unhooking is prevented. Pattern is not critical, but should be as balanced as the ceiling configuration permits. Where air turbulence or extreme vibration exists, units should be firmly fixed or securely mounted in channels.

Trademarks: The following trademark used herein is owned by United States Gypsum Company: ACOUSTISORBER.

UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

SC-811/USG/1-74

Printed in U.S.A.

"F" Fissured Acoustone*

acoustical ceiling tile and panels

Sound Control Products by United States Gypsum
101 S. Wacker Dr., Chicago, Ill. 60606

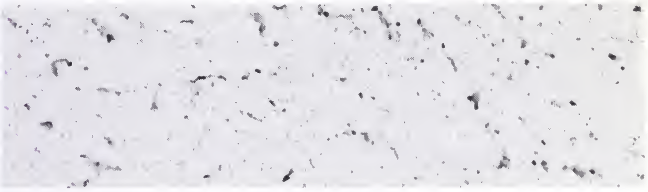
description

"F" Fissured ACOUSTONE Mineral Acoustical Tile and Panels... are composed of mineral-wool fibers and binder, molded, screeded and planed to form lightweight units. The planing produces a broad range of fissure variations, no two exactly alike, from modest veining to bold fissures, resembling the natural beauty of travertine marble.

A random application of fissure direction and intensity provides a finished, truly non-directional acoustical ceiling. The tile or panels may be suspended by exposed grid or concealed Z-runner systems, or adhesively applied to existing surfaces.

Limitations—Installation should not be made: (a) where tile or panels will be continuously exposed to high humidity (over 80% RH); (b) below wainscot height or where exposed to impact, abrasion or tampering. Square-edge Fissured ACOUSTONE is not recommended for critical lighting conditions. To prevent objectionable sag of panels, the weight of overlaid material such as insulation should be limited to a uniform load of 0.75 psf maximum.

Pattern



"F" Fissured

Color—Standard color is white; standard earthtone colors are sandstone, clay gray, pumice and ivory. TAL™ Latex Wall Paint colors also are available on special order.

Finish—Standard finish is washable vinyl coating, factory-applied and heat-cured. Fissured Tile and Panels are available with a special "PC" factory-applied plastic coating which reduces ceiling maintenance where high soiling is anticipated.

technical data

Physical Dimensions

Thickness (nominal): ¾"

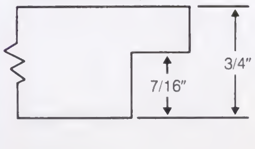
Standard Sizes:
12"x12" (adhesive application or concealed suspension)
12"x24", 12"x36" or 12"x48" (concealed or one-way exposed suspension)
24"x24", 24"x36" or 24"x48" (exposed grid suspension, Shadow Line edge)

Non-Standard Sizes: Practical sizes that can be cut from standard (24"x36", 24"x48" or 24"x72") ACOUSTONE molds available at extra cost

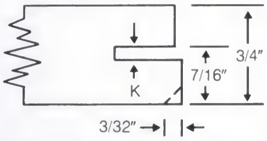
Edge Configuration: Bevel edge available in all 12" widths plus 24"x24" size; square edge available in all sizes, also Shadow Line edge in all 24" widths, for lay-in. Kerf available in all 12" widths plus 24"x24" bevel edge for concealed runner installation.

Kerf and Edge Dimensions:

Shadow Line Edge



Bevel or Square Edge



Kerf (K): .054" standard—for metal spline.
.0625" (1/16") available on special request.

*REG. U.S. PAT. & TM. OFF.

Weight—1.25 to 1.30 psf

Light Reflectance—Class **a** (ASTM C523 test procedure)

Thermal Resistance (R)—2.12

Installed Resistance:	heat flow up	heat flow down
adhesive mounting	2.72	3.02
metal suspension	4.18	4.88

(1) R-factors shown include "R" for inside air film and air space above installed ceiling unit.

Sound Absorption (ASTM C423 test procedure)

			sound absorption coefficients						
			band center frequency—Hz						
product	thickness	mounting	125	250	500	1000	2000	4000	NRC range
"F" Fissured ACOUSTONE	¾"	1	.09	.26	.79	.97	.84	.91	.65-.75
		7	.58	.62	.58	.79	.94	.97	.70-.80

Note: Surfaces tested were painted white. Mounting No. 1—adhesive application to gypsum board. Mounting No. 7—metal suspension system.

Sound Attenuation (AMA 1-II test procedure)

	sound attenuation factors—db																
	band center frequency—Hz																
	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	STC
¾" ACOUSTONE Tile; 12" x 12"; Fissured pattern; mounting Ad	37	44	46	43	48	52	53	51	52	57	60	>60	>60	>60	>60	>60	55-60
¾" ACOUSTONE Tile; 12" x 12"; Fissured pattern; mounting ICF	29	37	34	27	27	28	30	31	32	34	38	44	50	56	58	59	35-39
¾" Foil-Backed ACOUSTONE Panels; 24"x24"; Fissured pattern; mounting CE	27	34	36	29	30	34	36	40	40	42	44	43	44	44	46	47	40-44

Note: surfaces tested were painted white. Mounting AD—adhesive attachment to ½" gypsum panels screw-attached to indirect-hung suspension. Mounting ICF—concealed suspension system interrupted at partitions, flat splines. Mounting CE—exposed T-grid suspension system, continuous at partitions. Panel is face-rabbeted on four edges.

Fire Resistance—Type III Class 25 (Federal Spec. SS-S-118a). Fire hazard classification (ASTM E84 test procedure):

UNDERWRITERS LABORATORIES INC.®
CLASSIFIED
ACOUSTICAL MATERIAL
Not over 50 sq. ft. Issue No. 000

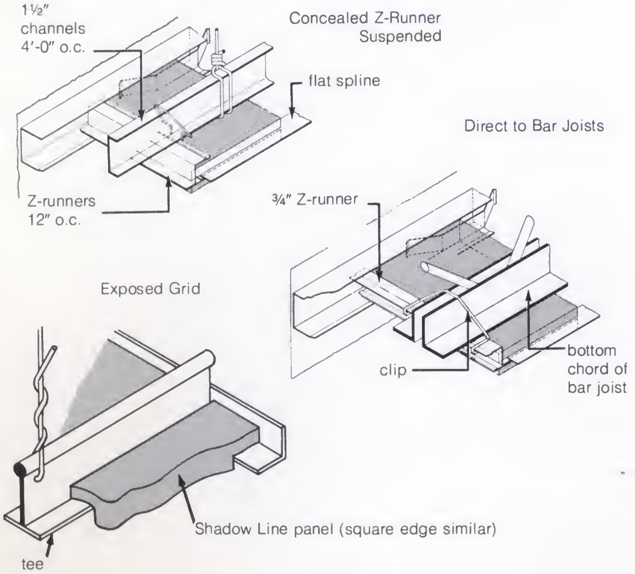
FIRE HAZARD CLASSIFICATION

Flame Spread 15
Fuel contributed 15
Smoke developed 0-15

SEE UL CLASSIFIED BUILDING MATERIALS INDEX

SAMPLE

Details—Typical Suspension Systems



installation

"F" Fissured ACOUSTONE Tile and Panels are sold installed, on a contract basis by qualified acoustical contractors. The contractor furnishes all labor and materials necessary to complete the job according to specifications in this data sheet.

availability

Available nationally—qualified contractors are located throughout the United States.

maintenance

Cleaning—wash with damp sponge or clean with a vacuum cleaner or chemical rubber sponge (used dry).

Repainting—roll or spray a non-bridging paint (TAL Latex Wall Paint or equal). Repaint "PC" surfaces with GRAND PRIZE* Latex Semi-Gloss Enamel or other non-bridging paint to retain natural semi-gloss appearance.

architectural specifications

notes to architect

"F" Fissured ACOUSTONE Tile and Panels are designed for installation and use under standard occupancy conditions at no more than 80% RH.

Related information may be found in current U.S.G. Architectural Technical Folder SA-905 on Sound Control Ceilings.

Part 1: general

1.1 scope—Specify areas to receive this acoustical treatment.

1.2 qualifications—Construction conditions shall comply with ASTM C636.

Acoustical material and suspension systems, including necessary hangers, grillage, splines, and other supporting hardware, shall be furnished and installed by a qualified contractor.

1.3 delivery and storage of materials—All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions—Installation of acoustical tile shall not begin until building is enclosed, permanent heating and cooling equipment in operation, and residual moisture from plaster, concrete or terrazzo work dissipated.

1.5 design conditions—System shall be rated NRC (   ) in accordance with ASTM C423 and STC (   ) in accordance with AMA 1-II as tested by an independent agency.

Part 2: products

2.1 materials

2.1.1 ACOUSTONE Mineral Acoustical (Tile)(Panels) by United States Gypsum, Fissured pattern, (   ) color, nom. ¾" thick, (12"x12")(12"x24")(12"x36")(12"x24")(24"x24")(24"x36")(24"x48") (bevel)(square)(Shadow Line) edge, 18 pcf min. density, (factory-applied acrylic plastic surface coating).

2.1.2 concealed suspension—commercially available Z-runner system meeting standards of ASTM C635, attached to 1½" channel grillage. Flat metal splines engage adjacent tile.

2.1.3 exposed grid (Shadow Line suspension)—Inverted tee, direct hung system meeting "intermediate" (or better) structural standards of ASTM C635.

Part 3: execution

3.1 suspended—Install acoustical material and suspension system, including necessary hangers, grillage, splines and other supporting hardware, in accordance with ASTM C636.

3.2 adhesive—Apply acoustical material, using an adhesive manufactured specifically for applying acoustical tile, in accordance with adhesive manufacturer's directions. Insert splines in kerfs at corners of units.

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SC-732/USG/rev. 8-76

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Printed in U.S.A.

Acoustone*
Space Units

sound-absorbing wall and ceiling units

Sound Control Products by United States Gypsum
101 S. Wacker Dr., Chicago, Ill. 60606

1.9

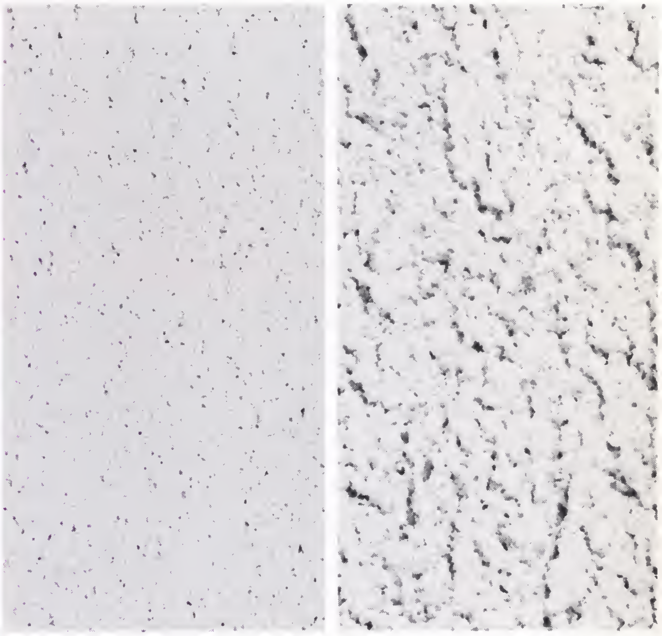
description

ACOUSTONE Space Units are free-standing, sound-absorbing design plaques composed of mineral fibers and binder, molded to form noncombustible, lightweight units. They can be used in many possible arrangements on either walls or ceilings as primary acoustical treatment, or as an economical supplement to other acoustical control. These efficient Space Units *absorb sound on all six surfaces* to reduce reverberation, the amount depending upon the number of Units and sound source frequency. And they are effective in eliminating flutter echo, reducing noise levels and treating "spot" problem areas in both new construction and remodeling.

Produced in two patterns—*Finesse*, with a finely textured smooth surface, and *Glacier*, featuring a heavily fissured rough surface—both designed for surface-mounting with two types of metal clip hardware and by adhesive attachment.

Limitations—ACOUSTONE Space Units are not recommended where subjected to impact, water immersion, splashing or condensation. They may be used under certain conditions of adverse temperature and humidity. Ceiling or overhead installation and adhesive attachment are not recommended where condensation is likely, such as in swimming pools and ice rinks.

Patterns



Finesse

Glacier

Color—Standard color is white. Standard finish is washable vinyl coating, factory-applied and heat-cured.

technical data

Physical Dimensions

Thickness (nom.): 2-1/4″

Standard Size (nom.): 10-1/2″ x 10-1/2″

Edge: Beveled

Weight—3 lbs./Unit (approx.)

Fire Resistance—Noncombustible; Type III Class 25 (Federal Spec. SS-S-118a).

*REG. U.S. PAT. & TM. OFF.

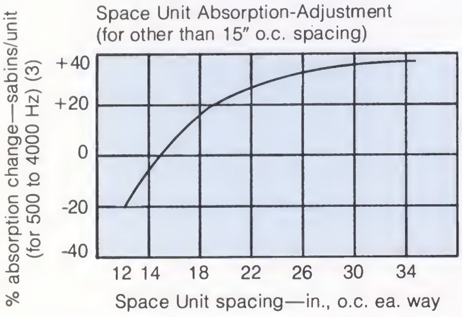
UNITED STATES GYPSUM
1976—5
9P
ACOUSTICAL TREATMENT
sound absorber

Sound Absorption (ASTM C423 test procedure)

	sabins/unit (1)					
	band center frequency—Hz					
product	125	250	500	1000	2000	4000
ACOUSTONE Space Units at 15″ o.c. ea. way (2)	0.3	0.8	1.4	1.7	1.4	1.3

(1) One sabin is the absorption equivalent of one square foot of material having an absorption coefficient of 1.00.

(2) Spaced in a regular pattern over a fairly large area of treated wall or ceiling. Other spacings may be used, but Space Unit absorption must be adjusted according to the chart below.



(3) 125 & 250 Hz bands not shown, since their absorption change at spacings greater than 15″ o.c. is negligible, closer spacings cannot be extrapolated.

design and installation

In designing buildings where acoustics are critical, such as concert halls, architects have always utilized room size and shape to achieve optimum reverberation time. Today, architects can control reverberation time in a wide variety of functions with ACOUSTONE Space Units.

Reverberation is one of the most important aspects of acoustics in architecture. It is the perpetuation of sound by reflected waves after the source has ceased, and is measured by "reverberation time". Technically, it is the length of time for the sound to die down to one millionth of its original value after the source ceases. Reverberation depends upon room size and shape, loudness and frequency of sound source and sound absorption of room and all contents (including people). It governs hearing conditions for music and speech and results in noise build-up in working areas as well.

Uncontrolled reverberations transform sound into noise, muffling music and disrupting effective communication. ACOUSTONE Space Units control reverberation for optimum acoustics.

If reverberation time is too short—under 0.6 seconds—the room is "dead", music lacks brilliance and tonal color; if too long—over 2.0 seconds—the room is "live" or excessively reverberant. Then speech becomes unintelligible, music blurs and distracting noise is prolonged and amplified. As reverberation time is lowered below 2 seconds, clarity of speech steadily improves to a point below 1 second, where further lowering produces no significant improvement. Music is more subjective, so a wide range of reverberation times is acceptable depending upon room size and type of music.

Studies on speech intelligibility and acceptability of performed music reveal that average desirable reverberation times generally fall within the following ranges (based on 500 Hz frequency, approximate pitch of male voices):

SPEECH

Small offices	.50 to .75 second
Classrooms & lecture rooms	.75 to 1.0 second
Work rooms	1.0 to 2.0 seconds

MUSIC

Rehearsal rooms	.80 to 1.0 second
Chamber music	1.0 to 1.5 seconds
Orchestral, choral, average church music	1.5 to 2.0 seconds
Large organ, liturgical choir	2.0 to 2.25 seconds

The desired reverberation time for rooms where the number of occupants will vary greatly, such as multi-purpose rooms and auditoriums, must represent a compromise. It is a simple matter, using the data presented here, to determine the number of ACOUSTONE Space Units needed to achieve desired reverberation time.

The excellent sound-absorbing properties of ACOUSTONE Space Units make them ideal for treatment of *flutter echo*. This phenomenon is a ringing effect produced by sound waves reflected repeatedly on a horizontal plane between non-sound absorbing, parallel walls of narrow rooms with high ceilings. It is most pronounced when listening ear and sound source are on the same plane—such as a speaker hearing his own voice. As might be expected, it is especially troublesome in small rooms and corridors, but also occurs to a lesser degree in larger rooms with unbroken areas of parallel walls. Gymnasiums are notable examples.

ACOUSTONE Space Units can be used effectively to reduce *reflected sound build-up,* the main cause of excessively noisy areas. How much noise endangers hearing is still a matter of research, but the Occupational Safety and Health Act clearly defines noise exposure limits considered safe. Industrial workers are limited to continuous or intermittent noise exposure as follows:

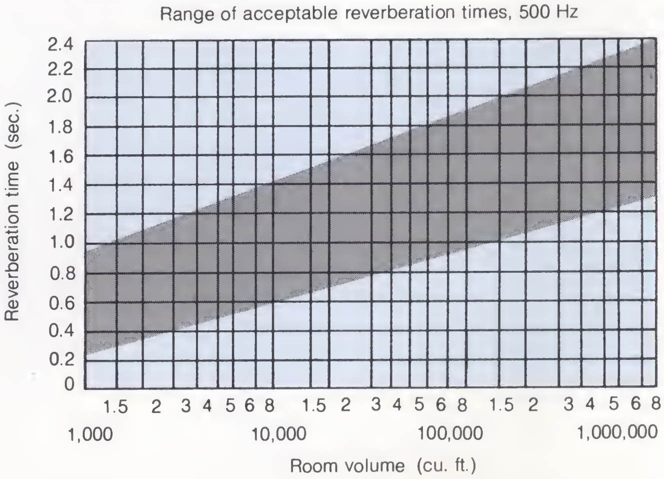
Noise Exposure (hrs./day)	Sound Level (dbA)	Noise Exposure (hrs./day)	Sound Level (dbA)	Noise Exposure (hrs./day)	Sound Level (dbA)
8	90	3	97	1	105
6	92	2	100	1/2	110
4	95	1-1/2	102	1/4 or less	115

An application of Space Units on 15″ centers can reduce room sound pressures up to 40%. This not only improves comfort, but also averts potentially harmful effects on hearing, and substantially reduces sound transmitted to other building areas. Consequently, less sound control may be needed in surrounding partitions and floor/ceilings.

Thus, ACOUSTONE Space Units can pay for themselves in the cost savings of other sound control materials—with noise reduction itself a bonus! Band practice rooms and similar occupancies can benefit from such treatment.

design procedure

Step 1. Compute cubic volume of room (V), then choose desired reverberation time from chart below, based upon intended activities for the room.



The lower part of the band should be used for rooms intended primarily for speech, the upper part for churches and concert halls where music is emphasized, and the middle portion for general purpose rooms where both speech and music may be presented.

Step 2. Compute total untreated room absorption (a) for all room surfaces and contents, using sound absorption co-efficients from the 500 Hz frequency band (chart, p. 3). Multiply the surface area (sq. ft.) of each item by its corresponding coefficient and total them to arrive at (a) in sabins. Use an audience size averaged between maximum and minimum anticipated, weighted for that likely to predominate.

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Sound Absorption Coefficients
Materials & Audience

Materials & Furnishings	*sabins / sq. ft.*					
Frequency (Hz)	125	250	500	1000	2000	4000
BRICK	.03	.03	.03	.04	.05	.07
CARPET, heavy, on 40-oz. pad	.08	.24	.57	.69	.71	.73
CARPET, tufted loop nylon, 17.5 oz., on 3/16" foam back	.05	.11	.22	.32	.26	.21
CONCRETE BLOCK, unpainted	.36	.44	.31	.29	.39	.25
CONCRETE BLOCK, heavily painted (oil base)	.10	.05	.06	.07	.09	.08
FABRIC hung in heavy, full folds	.14	.35	.55	.75	.70	.60
FLOORS, marble, terrazzo	.01	.01	.015	.02	.02	.02
FLOORS, resilient tile on concrete	.02	.03	.03	.03	.03	.02
FLOORS, wood on joists	.15	.11	.10	.07	.06	.07
GLASS, large panes, plate	.18	.06	.04	.03	.02	.02
GLASS, standard window glass	.35	.25	.18	.12	.07	.04
PLASTER on masonry	.01	.01	.02	.03	.04	.05
1/2" GYPSUM BOARD on studs 16" o.c.	.29	.10	.05	.04	.07	.09
3/8" PLYWOOD, light bracing, some air space	.28	.22	.17	.09	.10	.11
AIR, Sabins per 1,000 cu. ft. 20° C - 50% R.H.	.09	.20	.50	1.10	2.9	7.4
ACOUSTICAL TILE or PANELS	*see p. 28., U.S.G. Technical Folder SA-905*					
Seats and Audience	*sabins / sq. ft. of floor area*					
Frequency (Hz)	125	250	500	1000	2000	4000
Audience, seated in upholstered seats	.60	.74	.88	.96	.93	.85
Unoccupied cloth-covered upholstered seats	.49	.66	.80	.88	.82	.70
Unoccupied leather-covered upholstered seats	.44	.54	.60	.62	.58	.50
Wooden pews, occupied	.57	.61	.75	.86	.91	.86
Chairs, metal or wood seats, each, unoccupied	.15	.19	.22	.39	.38	.30

Step 3. Find reverberation time (T) for the untreated room by using the following formula:

$$T = \frac{0.05V}{a}$$

where T = reverberation time in seconds

V = volume of room in cubic feet

a_1 = untreated room absorption in sabins, or

a_2 = treated room absorption

Compare (T) of the untreated room with the desired (T) from Step 1, also whether it falls on the band of acceptable times. If not, ACOUSTONE Space Unit treatment is needed. Using the same formula, and the desired (T), compute the room absorption (a2) required to achieve it.

Step 4. The difference between the desired (a_2) and the untreated room (a_1) is the absorption (in sabins) needed to be added by ACOUSTONE Space Units. Divide this figure by the absorption per Space Unit at 500 Hz to arrive at the number of Space Units required (based on 15" o.c. spacing).

Step 5. If wall or ceiling areas available for treatment make it impractical to space the Units on 15" centers, determine the most desirable spacing. Then adjust the absorption per Unit accordingly from the Space Unit Absorption-Adjustment Chart and recalculate the number of Units required for the new spacing. Repeat the process if necessary. It is not necessary for an *entire* wall or ceiling to be treated, but the regular spacing pattern determined should be used over the treated portion of the area.

Step 6. Once the number of Units to be used is finally determined, use the same formula as in Step 3 to recheck (T) for the treated room, with (a) for both maximum and minimum anticipated audiences. If both (T) values fall on the band as acceptable reverberation times in the chart under Step 1, the design is complete.

noise level reduction

Reduction of noise levels with the use of ACOUSTONE Space Units may be calculated with common logs in the following formula:

$$\text{db reduction} = 10 (\log a_2 - \log a_1)$$

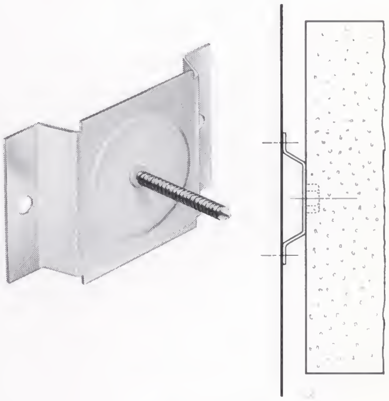
To compute compliance with OSHA requirements, refer to noise exposure limits at various dbA levels as shown in table on p. 2. If exposure is at varying levels and time periods, divide the number of hours at each level (E), by the number of hours maximum safe exposure (L) shown in the table for that level. The total of fractions expressing the entire working day should not exceed 1.0:

$$\frac{E_1}{L_1} + \frac{E_2}{L_2} + \frac{E_3}{L_3} + \dots \frac{E_n}{L_n} \leq 1$$

installation

spin-on clip—This standard wall clip should be centered not closer than 14", or 7" from any obstruction, to allow free rotation of the unit during installation.

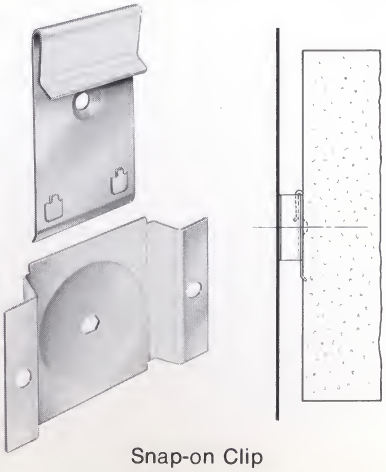
Secure wall clip with two suitable fasteners so that opening is vertical. Attach Space Unit, positioning the hole in the Unit's back on machine screw attached to the clip, and turning clockwise until secure. *Do not overtighten,* as this could *strip the nut within the Space Unit.*



Spin-on Clip

snap-on clip—Use this supplementary fastener for Space Units centered closer than 14", or less than 7" from obstructions. Use for concrete waffle slabs, intersecting walls or columns and pilasters, and other close-quarter installations.

Secure the standard wall clip to the wall with two suitable fasteners so that opening is vertical. Attach supplementary Snap-on Clip to Space Unit with a 1-1/2" USG® Type G Bugle Head Screw, or #10-24 machine screw. Finally, press the two clips together, first engaging the Snap-on Clip's upper lip and then the lower.



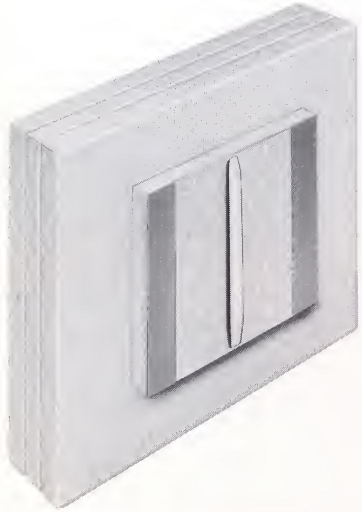
Snap-on Clip

adhesive—Wall and ceiling surfaces should be clean, dry and free of any loose material. Sand lightly to prepare surface.

Cut two 6″ long pieces of double-faced DURABOND® Space Unit Tape for each Space Unit. Remove any dust from surface of spacer block on Space Unit back. Place tape strips along two edges of spacer block to align vertically when Space Unit is installed. Press tape in place for good bond.

With caulking gun, apply 1/2″ bead of DURABOND Space Unit Adhesive the full width of the spacer block, centered between the tapes. Remove protective paper from tapes.

Position Space Unit at wall or ceiling before allowing tapes to make contact—unit cannot be moved after tapes contact. (Unit cannot be repositioned unless removed and tapes replaced.) Tape holds unit in place until adhesive sets—8 to 24-hr. period.



Adhesive Attachment

availability

Available nationally—ACOUSTONE Space Units are sold installed, on a contract basis, by qualified acoustical contractors. The contractor furnishes all labor and materials necessary to complete the job in accordance with specifications.

maintenance

Cleaning—wash with a damp sponge or clean with a vacuum cleaner, or chemical rubber sponge (used dry).

Repainting—roll or spray-paint with a non-bridging paint (TAL Latex Wall Paint or equal).

architectural specifications

notes to architect

Related information may be found in current U.S.G. Architectural Technical folder SA-905 on Sound Control Ceilings.

Part 1: general

1.1 scope–Specify areas to receive this acoustical treatment.

1.2 qualifications—Construction conditions shall comply with ASTM C636. Acoustical space units and attachment clips shall be furnished and installed by a qualified contractor.

1.3 delivery and storage of material—All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions—Installation of acoustical units shall not begin until building is enclosed, permanent heating and cooling equipment in operation and residual moisture from plaster, concrete or terrazzo work dissipated.

1.5 design conditions—Space Units shall be rated NRC (   ) when spaced at 15″ o.c. each way, in accordance with AMA 1-II as tested by an independent agency.

Part 2: products

2.1 materials—ACOUSTONE Mineral Acoustical Space Units by United States Gypsum, (Finesse)(Glacier) pattern, white color, 2-1/4″ thick, 10-1/2″x10-1/2″, 18 pcf min. density.

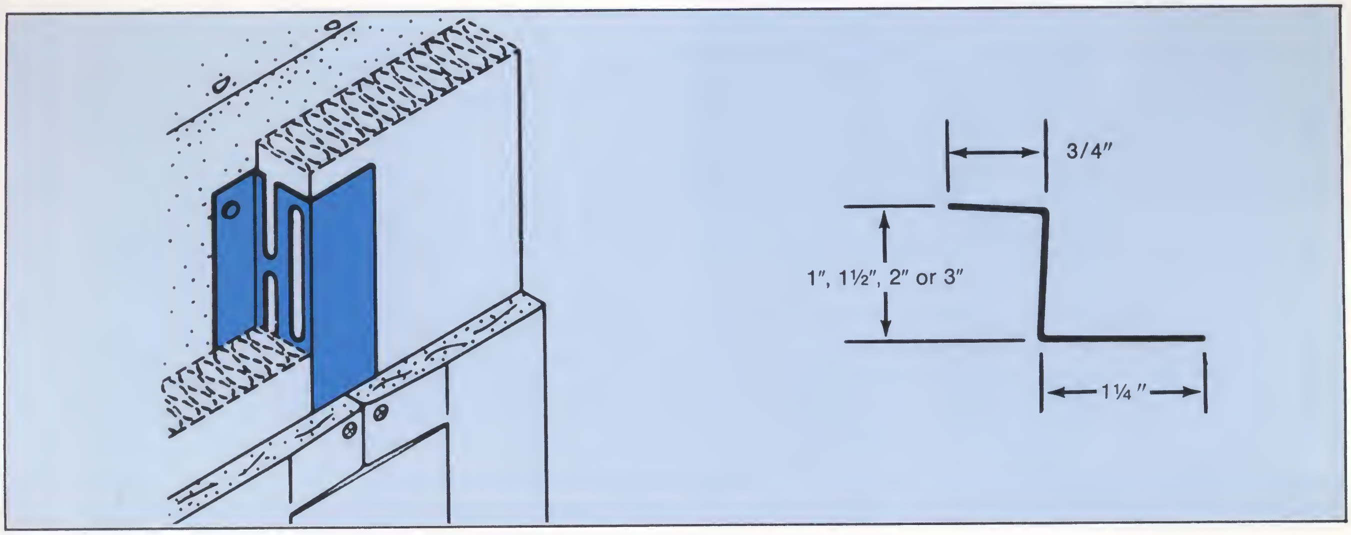
Part 3: execution

3.1 clip attachment—Install Space Units with Wall Clips attached with suitable fasteners to wall or ceiling. Attach Snap-on Clip to Space Unit with 1-1/2″ USG Type G Bugle Head Screw or #10-24 machine screw.

3.2 adhesive attachment—Install Space Units with DURABOND Space Unit Adhesive and DURABOND Space Unit Tape, 3/4″ wide x 1/8″ thick, applied to spacer block on Space Unit back.

*REG. U.S. PAT. & TM. OFF.

USG®
Z-Furring Channels
effective attachment of insulation and gypsum panels to masonry



description

USG Z-Furring Channel provides an effective and low-cost means of attaching mineral fiber or expanded plastic foam insulating materials to interior surfaces of masonry walls. Reduces heat loss by improving "U" Value of wall from .42 to .07 with 3″ Thermafiber Z-Furring Blankets.

Either gypsum panels or veneer base can be screw-attached to exposed knurled flanges of this channel to form an assembly with an excellent fire-resistive surface and high insulating value. Furring helps minimize effects of structural stresses; prevents wicking of moisture to inside surfaces. Slot design in web of channel minimizes thermal transfer to inside surfaces.

The channel is made of nom. 25-ga. hot-dipped galvanized steel, in furring depths of 1″, 1½″, 2″ or 3″. Attachment to masonry walls is fast and easy with standard fasteners and a hand- or power-activated device such as a Ramset Shur-Set Tool or Tapcon Concrete Fastening System.

Insulating materials for this system are semi-rigid Thermafiber Z-Furring Blankets, a spun-mineral-fiber product that is paperless and noncombustible—24″x48″ size and 1″, 1½″, 2″ or 3″ thick; or rigid foam polystyrene or polyurethane insulation, ranging from ¾″ to 3″ thick. Panels are applied progressively as furring channels are attached, each panel acting as a spacer for the next channel.

With insulation in place, Sheetrock Gypsum Panels or Imperial Gypsum Base is screw-attached to the 1¼″ knurled flange of the Z-Furring Channel. Both drywall and gypsum base joints are treated in the usual manner; a choice of veneer finishes for Imperial Base is available to provide smooth, monolithic surfaces, ready for decoration.

advantages

Positive attachment without adhesives. Double-duty channel is rigid and rust-resistant—easily attached with power-driven fasteners. No chance for failure as with adhesive-attached insulation.

Choice of insulating materials. Conserves heating and cooling energy by providing up to 3″ of insulation for exterior walls—savings that last for the life of the building. Use either fire-resistant Thermafiber Z-Furring Blankets meeting requirements for Class A construction, or rigid foam plastic insulation in thicknesses as required, protected by a noncombustible gypsum board surface.

Rapid application. No tedious surface preparation; conventional fasteners, tools and techniques used throughout. No separate foil or plastic vapor barriers needed with foil-back gypsum panels. No troweling or mastic cleanup.

Durable. Smooth, blemish-free interior surfaces are highly resistant to damage.

limitations

1. Gypsum panels not recommended for use where exposed to excessive moisture or continued wetting.
2. Max. spacing of Z-Furring Channel is 24″ o.c.
3. Imperial Veneer Plaster Systems not recommended for use in cold-storage areas.

(continued)

UNITED STATES GYPSUM

USG Z-Furring Channels

4. Where channel is spaced 24″ o.c., 1-in. foam and two-coat plaster must be used when ½-in. IMPERIAL Gypsum Base is specified. Either one- or two-coat IMPERIAL Plaster can be used with ⅝-in. IMPERIAL Gypsum Base and ¾-in. rigid foam.
5. Relief or control joints must be installed wherever furring system is located over building control joints or masonry wall relief. In no case should control-joint spacing exceed 30 ft. o.c.
6. A non-load bearing assembly.

ARCHITECTURAL SPECIFICATIONS

notes to architect

1. Temperature differentials in an exterior wall may cause interior condensation which, when combined with airborne dust, could result in "photographing" or shadowing over fasteners and furring. Because soiling and temperature differences are variables over which it has no control, United States Gypsum cannot be responsible for surface blemishes that may result.

2. *Warning:* Rigid foam (cellular plastic) insulation is combustible and may constitute a fire hazard if improperly used or installed. It should not be left exposed or inadequately protected. Use only as directed by the specific instructions accompanying the product.

3. These are abbreviated specifications. For additional information see U.S.G. Architectural Technical Folders SA-912, 923 & 924.

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications
All materials, unless otherwise indicated shall be manufactured by the United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 environmental conditions
A minimum temperature of 55°F. shall be provided and maintained in the building at least 72 hours prior to, during and after application of rigid foam insulation, gypsum panels, gypsum plaster base, joint treatment or plaster. Adequate uniform ventilation also shall be provided at all times to eliminate moisture from drywall finishing. With IMPERIAL Plaster, use minimum ventilation.

Part 2: products

2.1 materials

a. Furring Channel: USG Z-Furring Channel (1″) (1½″) (2″) (3″).
b. Concrete stub nails, power-driven fasteners of suitable size (not by U.S.G.), or 1⅝″ TAPCON™ Fastener.
c. Insulation: THERMAFIBER Z-Furring Blankets (1″) (1½″) (2″) (3″) thick, 24″ wide, 4′ long (fire-resistant); rigid-foam polystyrene or polyurethane (¾″) (1″) (1½″) (2″) (3″) thick, 24″ wide (not by U.S.G.).
d. Gypsum Panels (max. practical length to minimize joints): (Regular) (FIRECODE) (Foil-Back) (½″) (⅝″) thick, 48″ wide SHEETROCK Gypsum Panels; or (Regular) (FIRECODE) (Foil-Back) (½″) (⅝″) thick, 48″ wide IMPERIAL Gypsum Base.
e. Fasteners: (1″) (1¼″) USG Brand Type S Screws.
f. Corner Reinforcement: USG No. (800)(900) Corner Bead.
g. Control Joint: USG No. 093.
h. Joint Treatment: (Select a U.S.G. Joint System).
i. Joint Reinforcement, Veneer Finish: IMPERIAL Tape (Type P) (Type S).
j. IMPERIAL Basecoat Plaster: (hand-tool application) (machine application).
k. Finish Plaster: (IMPERIAL Finish Plaster) (DIAMOND Interior Finish) (STRUCTO-GAUGE-lime) (Keene's-lime-sand float finish).

Part 3: execution

3.1 insulation and furring channel erection
Erect mineral fiber or rigid-foam insulation vertically and hold in place with Z-Furring Channels spaced 24″ o.c. max. Except at exterior corners, attach narrow flanges of furring channels to wall with concrete stub nails or power-driven fasteners spaced 24″ o.c. At exterior corners, attach wide flange of furring channel to wall with short flange extending beyond corner. Start from this furring channel with a 3″ strip of insulation followed by furring channel positioned in normal manner. At interior corners, space second channel no more than 12″ from corner and cut insulation to fit. Hold insulation in place with 10″-long staple, field-fabricated from 18-ga. tie wire, inserted through slot in channel. Apply wood blocking around window and door openings and as required for attachment and support of fixtures and furnishings.

3.2 gypsum panel application
Apply single-layer gypsum panels vertically, with vertical joints occurring over channels. Use no end joints in single-layer applications. Attach with 1″ Type S Screws spaced 12″ o.c. in field and at edges of board. For double-layer application, apply first layer vertically, second layer either horizontally or vertically with vertical joints offset by at least one furring member spacing. Space screws 16″ o.c. with framing members at 16″ o.c., 12″ o.c. with framing members at 24″ o.c. At exterior corners use 1¼″ screws, spaced 12″ o.c.

3.3 accessory application
(See specifications in U.S.G. Folder SA-912.)

3.4 drywall joint treatment
(See specifications in U.S.G. Folder SA-923.)

3.5 veneer finish application
(See specifications in U.S.G. Folder SA-917.)

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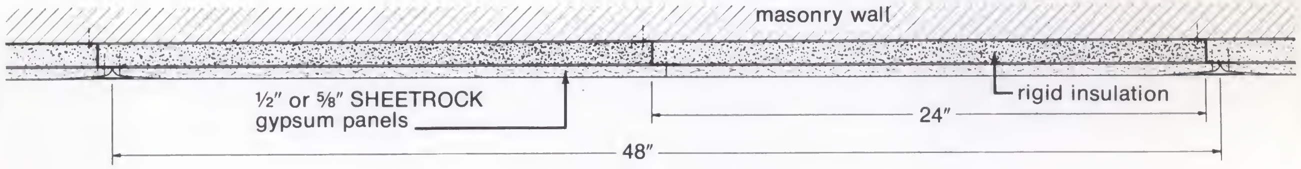
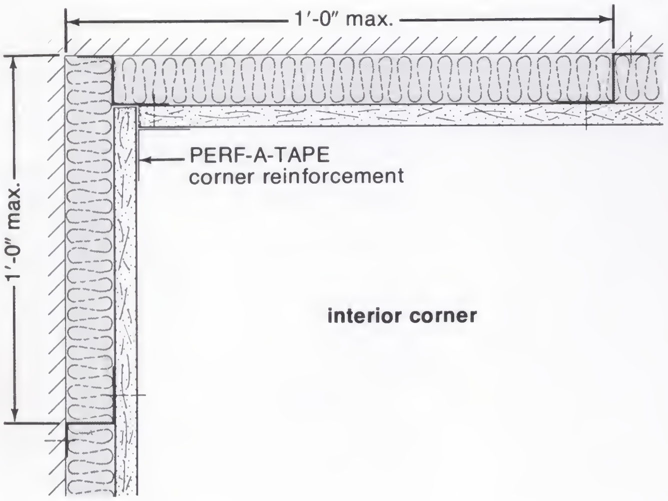
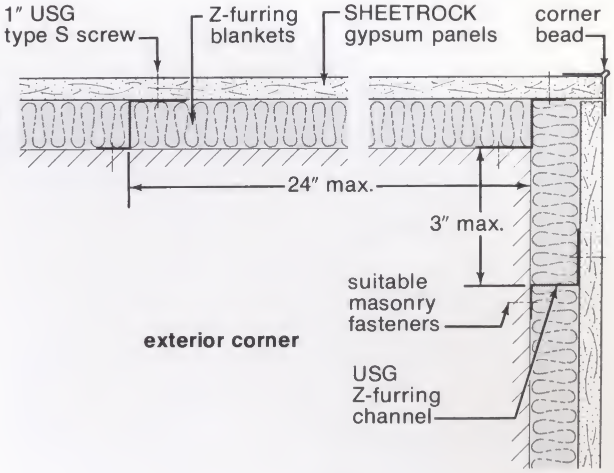
Detail of attachment of furring channel, insulation and wallboard

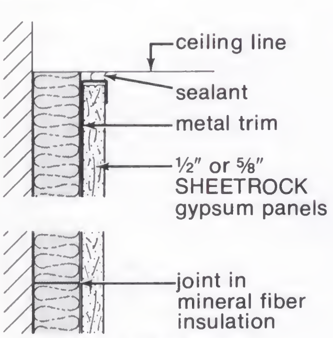




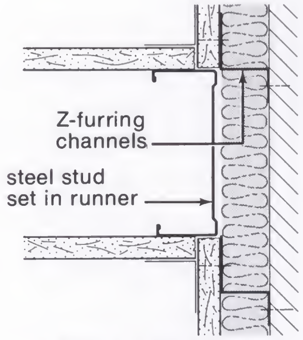
interior corner



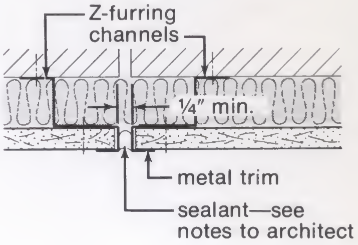
exterior corner


ceiling line
sealant
metal trim
½″ or ⅝″ SHEETROCK gypsum panels
joint in mineral fiber insulation

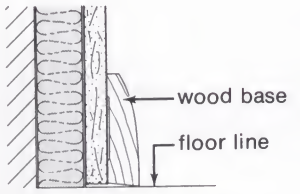
ceiling attachment



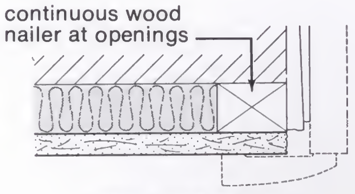
partition wall intersection



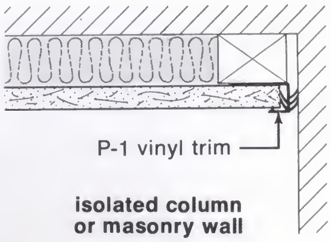
wall control joint



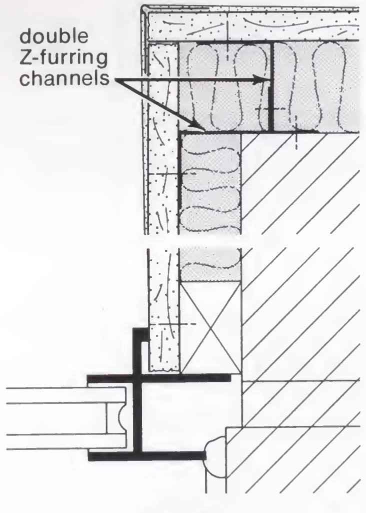
floor attachment & base



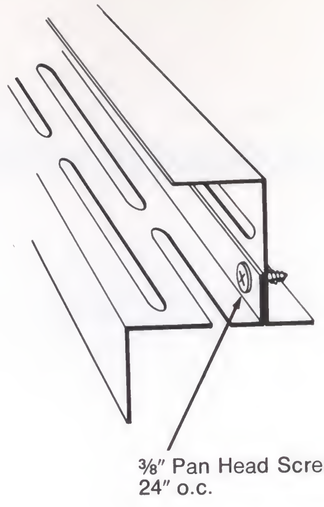
jamb cross section



isolated column or masonry wall

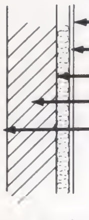


jamb



TECHNICAL DATA

To obtain the coefficient of transmission, or "U" factor (Btu per sq. ft. per hr. per degree F. through the walls), the following calculations are made. Thermal resistance values for materials are found below.



0.68	air surface value (room side)
0.45	½″ IMPERIAL Gypsum Base & Plaster
8.0	2″ THERMAFIBER Z-Furring Blankets
0.64	8″ concrete (sand & gravel aggr.)
0.17	outside air (15 mph velocity)
9.94	total thermal resistance of assembly (U = .10)

heat flow horizontal

Figures opposite the various building materials are reciprocals, or "R" values—also known as resistances—of either "k", "C" or "U" factors. The resistances or reciprocals are added to obtain the "R" of 9.94 that represents the toal resistivity. To obtain the "U" factor—or coefficient of transmission—for one square foot of wall area per degree difference per hour, divide 1 by 9.94: 1/9.94 = .10.

To illustrate the insulating value of THERMAFIBER Blankets, figure total thermal resistance without insulation: 9.94-8 (resistance of insulation) = 1.94. To find the "U" factor, divide 1 by this number: 1/1.94 = 0.52.

Comparing the "U" factors of the uninsulated wall (0.52) and the insulated wall (0.10) shows that 80% of the heat loss through this particular wall section has been eliminated by the addition of insulation (0.50-0.10) = 0.4; 0.4/0.5 = 80%).

heat transmission coefficients (U-factors)

wall construction	nom. wall thickn.	unfin. wall	furred wall(1) (no insul.)	wall insulated with—										
				THERMAFIBER Z-Furring Blkts. (2)				rigid polystyrene (3)				rigid urethane (4)		
				1″	1½″	2″	3″	1″	1½″	2″	3″	1″	1½″	3″
4″ face brick 8″ block	12″	.42	.26	.14	.11	.09	.07	.15	.12	.09	.05	.11	.08	.04
4″ face brick 4″ com. brick	8″	.48	.28	.15	.12	.09	.07	.16	.12	.10	.06	.11	.08	.04
poured conc. 140 lb./cu.ft.	8″	.69	.34	.17	.13	.10	.07	.18	.13	.11	.06	.12	.08	.04
conc. block, sand & gravel aggregate	8″ 12″	.51 .47	.29 .28	.15 .15	.12 .12	.10 .10	.07 .07	.17 .16	.13 .12	.10 .10	.06 .06	.11 .11	.08 .08	.04 .04

(1) Interior wall finish: 1/2″ IMPERIAL Base and Plaster. (2) k equals 0.24 for 1″ thickness, 0.25 for other thicknesses, (3) k equals 0.26. (4) k equals 0.15. All U-factors expressed in Btu/sq. ft./hr./°F, 75°F mean insulating temperature. Values based on 1965-6 ASHRAE Guide and winter condition (15 mph wind).

thermal resistance values(1) (1/C)

for use in calculating heat transmission coefficients (U)

25/32″ Insulating Board Sheathing(2)	2.06
1/2″ Insulating Board Sheathing (2)	1.32
1/2″ USG Gypsum Sheathing (2)	0.45
1″ THERMAFIBER Z-Furring Blanket(2)	4.0
1½″ THERMAFIBER Z-Furring Blanket(2)	6.0
3″ THERMAFIBER Z-Furring Blanket(2)	12.0
25/32″ Softwood (pine)	0.98
3/4″ Hardwood	0.68
Asbestos Shingles	0.21
1″x8″ Wood Drop Siding	0.79
3/4″x10″ Bevel Wood Siding	1.05
ORIENTAL Exterior Stucco (per in. thickness)	0.20
1/2″ SHEETROCK Gypsum Panels	0.45
3/8″ ROCKLATH Plaster Base	0.32
1/2″ Sanded Plaster	0.09
1/2″ Plaster with Lightweight Aggregate	0.32
Portland Cement with Sand Aggregate (per in.)	0.20
4″ Common Brick	0.80
4″ Face Brick	0.44
8″ Clay Tile	1.85
8″ Concrete Block with Sand Aggregate	1.11
Vapor-Permeable Felt	0.06
Vapor-Barrier Plastic Film	negl.

(1) Based on listings in ASHRAE Guide & Data Book. (2) Based on data by United States Gypsum.

PRODUCT DATA

Material: Hot-dipped galvanized steel
Weights (lb./MLF): 240 (1″), 268 (1½″), 312 (2″), 398 (3″)
Length: 8′-6″; *Width:* 2″; *Furring depth:* 1″, 1½″, 2″, 3″
Packaging: Bundles of 25 pcs.—212.5 lin. ft.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, THERMAFIBER, IMPERIAL, FIRECODE, DIAMOND, ROCKLATH, ORIENTAL, STRUCTO-GAUGE.

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

CS-27/USG/10-76

Printed in U.S.A.

SHEETROCK® SW Gypsum Panels

with the exclusive tapered-and-rounded edge for Smooth Walls with stronger joints

- **Drywall of highest quality**
- **Compensates for minor irregularities**
- **Reduces callbacks**
- **Fire- and sound-rated systems available**

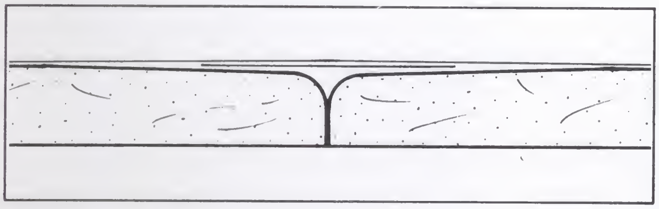
DESCRIPTION

SHEETROCK SW Gypsum Panels have a special patented* tapered-and-rounded edge design to help minimize ridging, or beading, but otherwise perform identically to SHEETROCK Regular Gypsum Panels. This edge design helps to compensate for the effects of slight panel or stud misalignments, joint imperfections and damaged board edges.

Although panel application and joint taping is conventional, joint filling—with DURABOND 90 Joint Compound—provides a superior result with the strongest, smoothest drywall joint ever developed.

DURABOND 90 Joint Compound, one of a wide-ranging line of U.S.G. joint treatment products, hardens chemically in about 1-1/2 hr., producing exceptional bond and minimal shrinkage. The edge contour eliminates the need to crown joints, and no more joint compound is required than with conventional edges.

Introduced some years ago, to overcome a major industry problem of "joint ridging" or "beading", it has been in continual demand by a loyal following of quality contractors ever since. Over 4 billion square feet of this patented panel have been placed in trouble-free service. It is available in 5/8", 1/2" or 3/8" thicknesses for single- and double-layer wall or ceiling applications.



ADVANTAGES

Smoother walls—The SW edge design, exclusive with U.S.G., makes possible smoother walls every time, because it compensates for temperature/humidity conditions which cause "ridging" or "beading", and also joint deformation from framing imperfections. Ridges just don't happen—now or later.

Stronger joints—Joints stay smooth because they're prefilled with DURABOND 90 Joint Compound, which hardens chemically into a rock-hard, exceptionally well-bonded joint. Shrinkage is virtually eliminated.

Fewer callbacks—The real problem in "ridging", or "beading", is that it often occurs long after the job is finished, necessitating one or more callbacks. SHEETROCK SW Panels minimize ridging, the greatest single source of drywall callbacks. With smooth joints made possible by SW edges, finishing walls better is also easier.

limitations

1. Not recommended for use where exposure to moisture is extreme and continuous.

2. In order to attain fire-resistance ratings, the construction of partition and/or floor-ceiling assemblies must conform to the designs shown in the test report.

3. To prevent objectionable sag in ceilings, weight of overlaid unsupported insulation should not exceed 1.3 lb./ft.^{2} for 1/2-in. thick panels with frame spacing 24 in. o.c.; 2.2 lb./ft.^{2} for 1/2-in. panels with frame spacing 16 in. o.c. or 5/8-in. panels with frame spacing 24 in. o.c. A vapor barrier should be installed in exterior ceilings, and plenum or attic space properly vented.

4. Maximum spacing of frame members for single layer, new, wood-frame construction:

thickness	location	application method(1)	max. frame spacing, o.c. (in)	(mm)
3/8" (9.5 mm)	ceilings(2)	perpendicular(3)	16	406
	sidewalls	parallel or perpendicular	16	406
1/2" (12.7 mm)	ceilings	parallel(3)	16	406
		perpendicular	24(4)	610
	sidewalls	parallel or perpendicular	24	610
5/8" (15.9 mm)	ceilings	parallel(3)	16	406
		perpendicular	24	610
	sidewalls	parallel or perpendicular	24	610

(1) Long edge relative to framing. (2) Not recommended below unheated spaces. (3) Not recommended if water-based spray-texture finish is used. (4) Max. spacing 16" for water-based spray-texture finish application.

UNITED STATES GYPSUM

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*U.S. Patent No. 3,435,582.

SHEETROCK SW Gypsum Panels

ARCHITECTURAL SPECIFICATIONS

notes to architect
These are abbreviated specifications for regular gypsum panels with the tapered-and-rounded (SW) edge. For additional information and complete specifications, see U.S.G. Architectural Technical Folders SA-923, 924 & 927.

Part 1: general
1.1 scope—*Specify to meet project requirements.*

1.2 qualifications
All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials
All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions
In cold weather and during gypsum panel application and joint finishing, temperatures within the building shall be maintained within the range of 55° to 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products
2.1 materials
a. *Gypsum Panels:* (Regular) (Foil-Back) Sheetrock SW (Firecode) (Firecode "C") (3/8") (1/2") (5/8") thick, 48" wide (in lengths as long as practical to minimize number of joints).

b. *Corner Reinforcement:* (Dur-A-Bead No. 103, 104) (No. 800).

c. *Metal Trim:* USG No. (200-A) (200-B) (200-C) (400, 401 or 402), (801-A) (801-B).

d. *Fasteners:* USG Screws—type (W) (G) (S) (S-12) (S-16) (S-18); Nails—GWB-54 Annular Ring *(obtain locally).*

e. *Control Joints:* USG No. 093.

f. *Drywall Adhesives:* (Durabond Joint Compound—Taping or 90) (Durabond 200, 300, 500, 600, Multi-Purpose Adhesive) (Durabond Vinyl Foam tape).

g. *Joint Reinforcement:* Perf-A-Tape Reinforcing Tape.

h. *Joint Compounds:* (USG Ready-Mixed) (USG—Powder) (Durabond 90 or Taping).

Part 3: execution
3.1 gypsum panel application
a. Position all ends and edges of all gypsum panels over framing members, except when joints are at right angles to framing members as in perpendicular application.

b. Apply Sheetrock SW Panels first to the ceiling and then to the walls. Extend ceiling board into corners and make firm contact with top plate. To minimize end joints, use panels of maximum practical lengths. Fit ends and edges closely, but not forced together. Stagger end joints in successive courses with joints on opposite sides of a partition placed on different studs.

c. Attach panels to framing supports by: (Standard Single- or Double-Nailing Method) (USG Screws) (Durabond Adhesive). Space fasteners not less than 3/8" from edges and ends of panels and drive as recommended for specified fastening method. Drive fasteners in field of panels first, working toward ends and edges. Hold panel in firm contact with framing while driving fasteners. Drive fastener heads slightly below surface of gypsum panels in a uniform dimple without breaking face paper.

d. Install trim at all internal and external angles formed by the intersection of gypsum panel to other surfaces. Apply corner bead to all vertical or horizontal external corners in accordance with manufacturer's directions. Treat fasteners and joints per manufacturer's directions. Pre-fill with Durabond 90 Compound all grooves formed by rounded SW edge.

PRODUCT DATA

U.S.G. Gypsum Panel Availability

Thickness(1)		Core Type			Foil-Back Option	Lengths(1)				
(in)	(mm)	Reg. (2)	FC (3)	FC "C" (4)		8 ft. (2.4 m)	9 ft. (2.7 m)	10 ft. (3.0 m)	12 ft. (3.7 m)	14 ft. (4.3 m)
3/8	9.5	X			X	X	X	X	X	X
1/2	12.7	X		X	X	X	X	X	X	X
5/8	15.9	X	X	X	X	X	X	X	X	X

(1) All panels 4-ft. width; (2) Regular; (3) FIRECODE; (4) FIRECODE "C".

Weights (approx.)

Thickness		Regular Core		FIRECODE Core FIRECODE "C" Core	
(in)	(mm)	(lb/1000 ft^2)	(kg/100m^2)	(lb/1000 ft.^{2})	(kg/100m^2)
3/8	9.5	1,450	710		
1/2	12.7	1,760	860	1,990	970
5/8	15.9	2,310	1,130	2,420	1,180

Compliance with standards: Meet Federal Specification SS-L-30D; ASTM C36-76.

Thermal coefficient of expansion (unrestrained): 9.0 x 10^{-6} in. per in. per °F. (40°—100°F.); 16.2 mm per km per °C. (4.5—37.8 °C.).

Hygrometric coefficient of expansion (unrestrained): 5.4 x 10^{-6} in. per in. per % r.h. (5%—90% r.h.); 5.4 mm per km (5%—90% r.h.).

Fire hazard classification: Flame spread 15, fuel contributed 15, smoke developed 0.

Packaging: 2 panels per bundle.

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, SHEETROCK, DURABOND, FIRECODE, PERF-A-TAPE, DUR-A-BEAD.

UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

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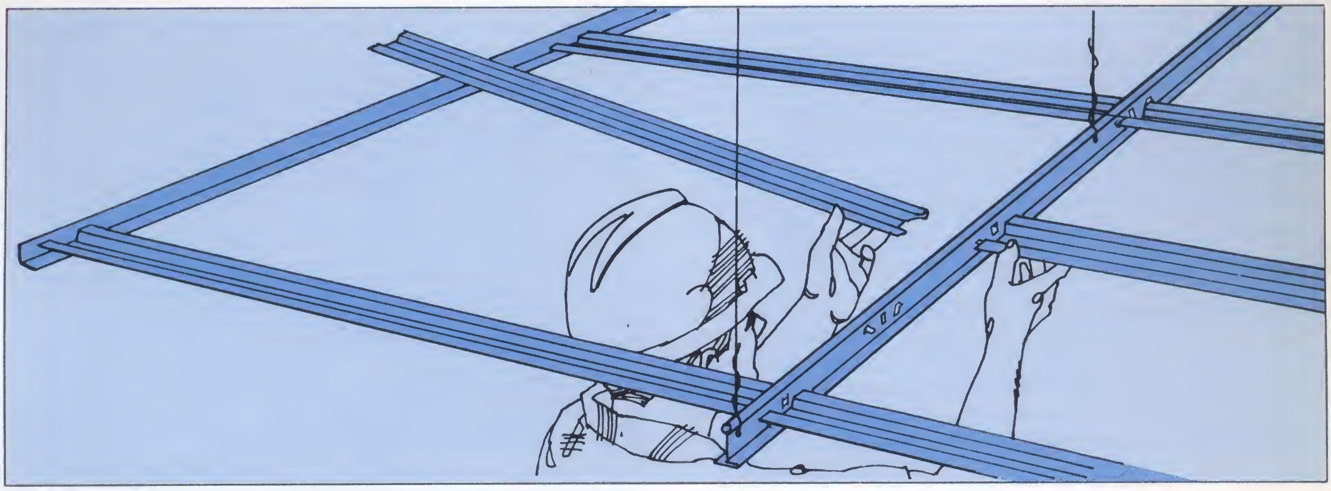
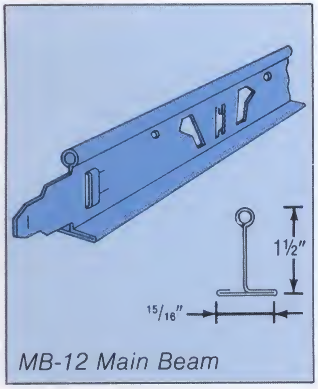
Printed in U.S.A.

NEW
USG®
Direct Suspension System—

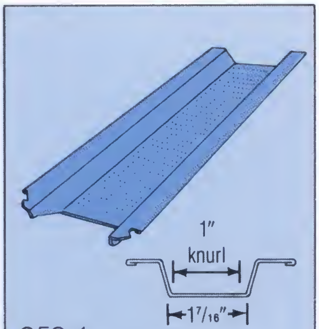
An UL-rated, direct-hung grid—for screw application of drywall and veneer systems



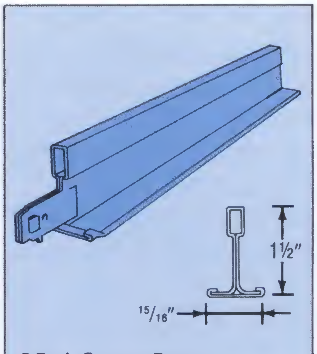
components



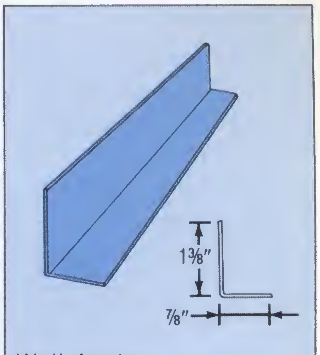
MB-12 Main Beam



CFC-4
Cross Furring Channel



CB-4 Cross Beam



Wall Angle

description

The new USG Direct Suspension System is a direct-hung steel ceiling grid for screw application of gypsum panels and veneer finish systems in commercial and industrial buildings.

This new factory-designed module system consisting of simple, snap-lock parts, eliminates extra job steps required with cold-rolled channel suspension systems. It provides increased labor-savings, fast erection, 1- 2- and 3-hour Underwriters Laboratories Inc. fire ratings, and durable performance. The system makes all other similar suspension systems obsolete.

There are only 4 basic components to install:

MB-12 Main Beam, a heavy-duty 12-ft. standard prepunched and indexed Tee Beam, notched 8 in. o.c. to permit 16 and 24 in. o.c. cross furring channel to lock in. Also allows integral splicing without clips or plates.

CFC-4 Cross Furring Channel has knurled surface and 25 ga. metal thickness which make screw penetration quick and easy. Channel simply locks into main beam. Incandescent fixtures can be accommodated.

CB-4 Cross Beam supports edge of light fixtures; allows installation of standard lay-in light fixtures.

Wall Angle simplifies attachment of cross furring channel; provides backup for gypsum panels.

advantages

Simply designed, the fire-rated USG Direct Suspension System is unique in performance, low in cost and quick to install. Provides structural integrity which meets most specifications. One inventory serves fire-rated or non-rated requirements.

Fast, easy installation—The new USG Suspension System hangs up as easily as a common Tee Beam. It's the fastest known way of suspending a ceiling. Cross channels require 40% fewer screws than comparable fire-rated systems. The new system provides a rigid, stable base for secure attachment; there's no section twisting or racking. Hanger wires designed for easy bending and tie-off.

Fire-rated assemblies—USG Suspension Systems have 1½-hour (UL Design No. G-528); 2- and 3-hour ratings

continued

UNITED STATES GYPSUM

UNITED STATES GYPSUM
1977–7
9 P
GYPSUM DRYWALL
systems – steel frame

USG
Direct Suspension System

under steel joists and concrete 3- hour beam protection (UL Design No. G-529); and a 1-hour rating under wood joists and decks (UL Design No. L-525). Drop-in lights can be framed with fire-rated cross beam, and tented, with SHEETROCK® FIRECODE® "C" Gypsum Panels. Gap in flange of main beam after splice is locked in, provides expansion relief that gives this section superior performance under fire conditions.

Low cost—In addititon to low-cost components and fewer fasteners, the system has many built-in time- and labor-saving features. Fewer wall angles are needed; factory defined modules and snap-lock parts speed installation.

Sturdy. durable performance—Main beam has capability of carrying 16 lb. per lin. ft. load, and the system (except gypsum panels) can carry point loads of up to 30 lb. at any location on the Main Beam or Cross Furring Channel without exceeding a deflection of l/360. Provides the same capability as a cold-rolled channel grid. Heavy-duty steel, snap-lock construction and strong 12-ga. hanger wires 48 in. o.c. give ceilings rigid. stable support.

Compact packaging—Provides easier handling, requires less storage space to reduce inventory costs.

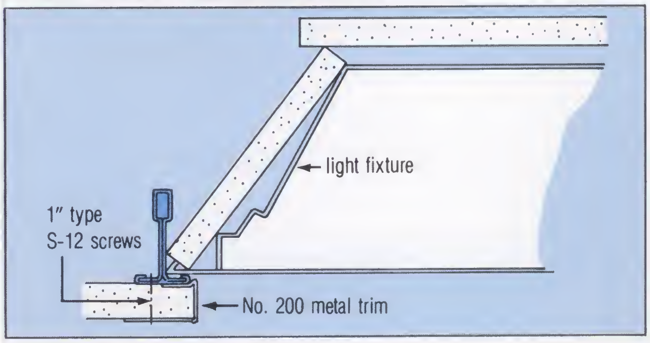
installation

Install wall angle on wall perimeter at a level above intended ceiling line equal to thickness of gypsum panel used.

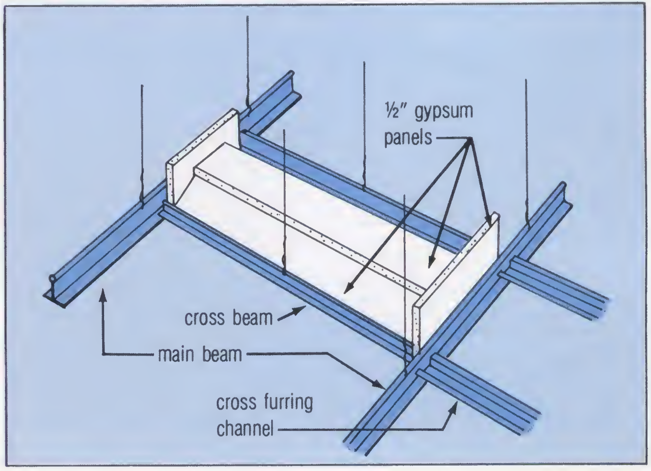
Attach hanger wires (12 ga. min.) to overhead and bend to desired level.

Connect main beams to pre-bent hanger wires, or attach with laser leveling. Place beams in parallel rows 48" o.c. and support by hanger wires spaced a max. of 48" o.c. along each row. Suspend main beam at same level as wall angle. Tie off wires and secure by twisting at least three full turns. Main beam slots must be aligned to permit installation of straight rows of cross furring channels. Engage and fix end splices of main beam by bending the tab ends with a screw driver to insure continuity in each row.

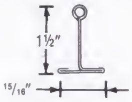
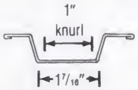
Detail—cross-section at fixtures



Detail—light fixture fire protection



technical data

	Section	Moment of Inertia (in⁴)	Section Modulus (in³)
Main Beam (24 ga.)		.0280	.0290
Cross Channel (25 ga.)		.0116	.0260

NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

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es Gypsum Company

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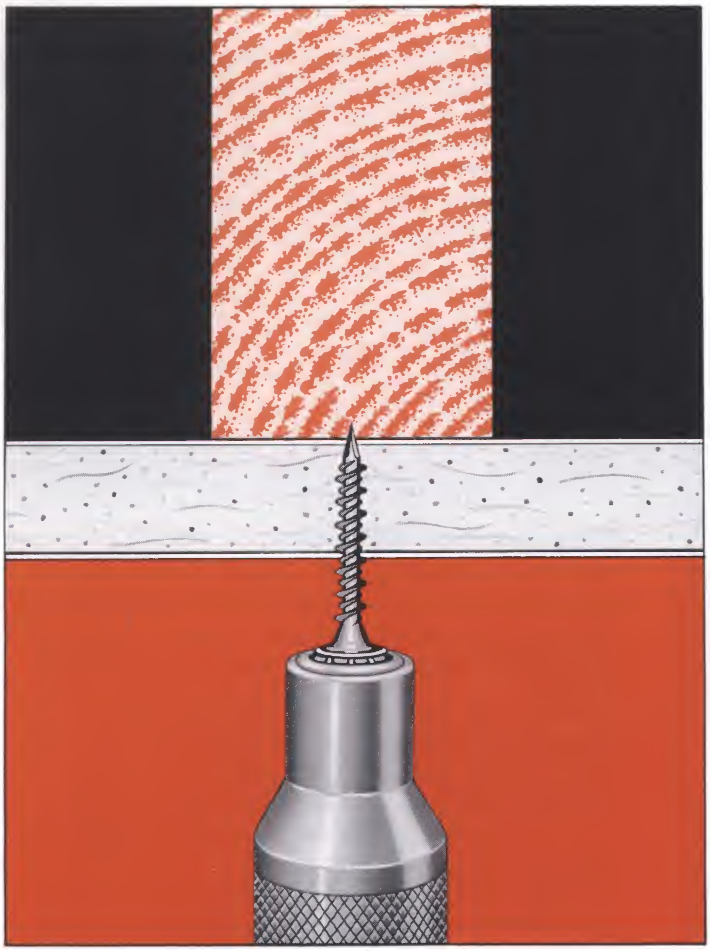
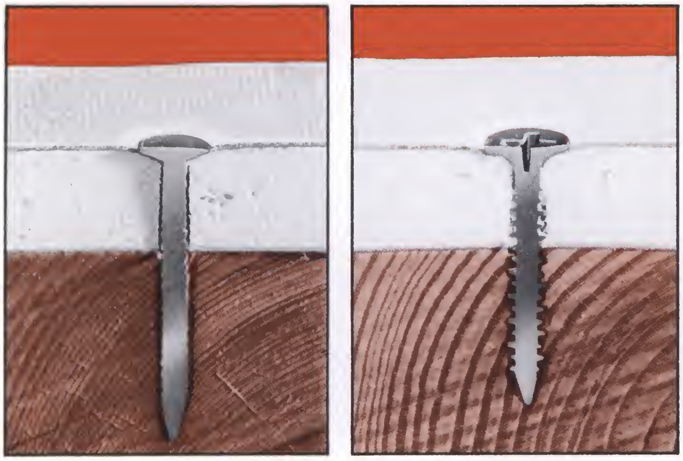
USG® Type W Drywall Screws...

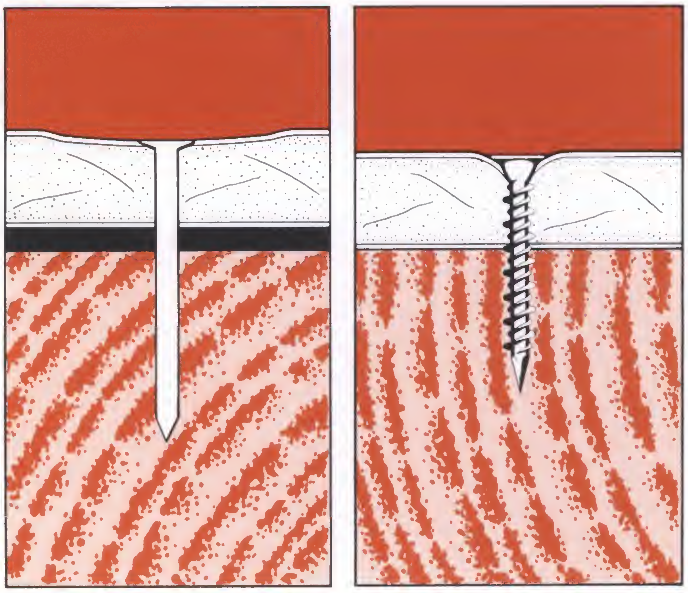


for better attachment of wood-framed drywall

UNITED STATES GYPSUM



- **Positive, permanent attachment—no loose fasteners, rarely any "pops"**
- **Quick, easy driving—alignment assured, splitting eliminated**
- **Foolproof installation—correct depth, no torn paper or damaged panels**
- **Savings in material—fewer fasteners, less joint compound**
- **Total economy—callbacks, labor and "spotting" time reduced**



Pullout Strength

Type of Test (in yellow pine)	#11-16 dbl. high/low thread	GWB-54 nail
Pullout strength (lb., avg.)	630	133

when nails hang loose, USG Type W Screws stay uptight

...put a smoother face on drywall interiors

USG Type W Bugle Head Drywall Screws are designed specifically for smooth attachment of gypsum panels to wood framing, without nail pop problems. With patented and special features such as self-drilling slotted nail-point, double high/low thread design, bugle-shaped head and special rust-resisting finish, they provide the solutions to problems with nailing.

head-and-shank over nails

...screw fastening with superior holding power

Sure Cure for Nail Pops

Nail pops are the biggest headache in wood-framed gypsum drywall construction and, as the source of most callbacks, the most expensive. Caused by loose nailing, shrinkage of high-moisture wood members, bowed panels or vibration from subsequent nailing, the heads pop back out from the gypsum panel surface. Using longer nails for a better grip only worsens the effect (which is proportional to nail length). For a more complete discussion of nail pop causes and cures, see U.S.G. Technical Bulletin CS-17, "Nail Pop Control In Gypsum Drywall."

USG Screws squeeze the wood and restrain it between each pair of threads to create much greater holding power than nails, which act like a wedge, grip only with friction. In fact, comparative tests show that the double high/low thread design of the Type W wood screw develops 350% greater pullout strength than the GWB-54 nail. As might be expected, the occurrence of wood splits is virtually eliminated with this double high/low thread design.

Protection of Panel Facing

Another major problem with nailing drywall is that driving depth is critical. Underdriving gives loose attachment, and a probable nail pop. Therefore, nails are often over-driven, with the nailhead tearing through the face paper, and fracturing the panel core.

USG Screws, however, turn their way "home", compressing both gypsum panel and wood between threads for a positive and permanent grip. The bugle-shaped head depresses the paper beneath it,

Copyright 1977, United States Gypsum Company

without danger of tearing. Screws are quickly driven to the proper, pre-set depth with minimum pressure, and they won't back out or loosen. Panel core is undamaged and the surface is smooth and unmarred —a strong, durable attachment.

Forgiving of Wood-Framing Faults

Nails present enough problems of their own, yet they are often asked to compensate for natural variations and faults in wood framing members—like twisted, poorly aligned or bowed studs. Nailing to tighten a panel to a bowed stud, or nailing obliquely into the grain of a twisted member usually results in loose or crooked attachment and protruding nailheads.

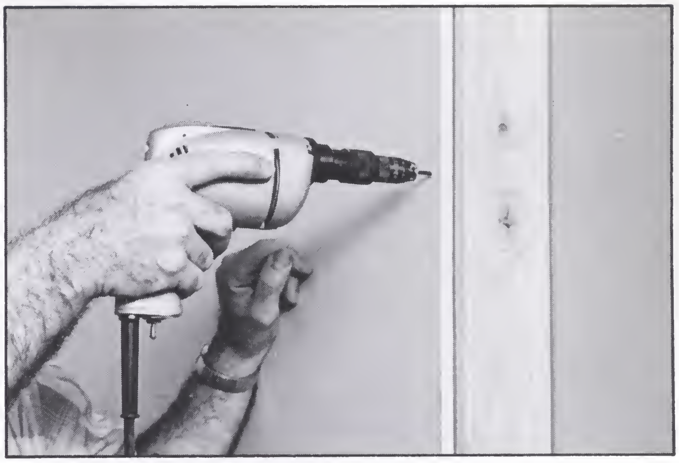
USG Type W Screws come to the rescue with a head engineered to distribute the load and pull the panel without pulling through it, and a patented thread design that grips far better than nails. They drive straight in the direction they're guided, without deflection by wood grain.

economy is measured by performance and in-place cost ...not by the price of nails

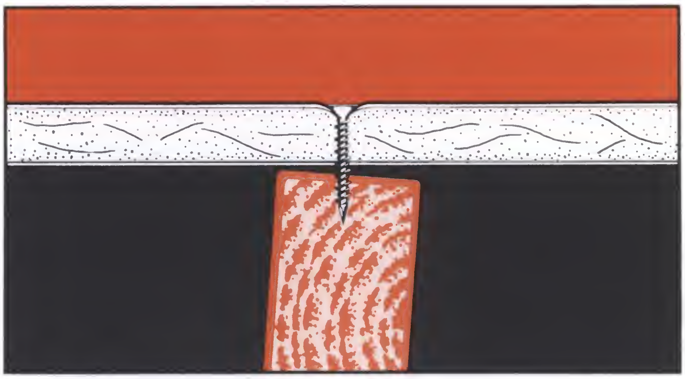
It's true that USG Screws may cost more than inferior fasteners, because they're designed to do a specific job better: problem-free attachment of gypsum panels to wood framing. But superior holding power means greater fastener spacing, fewer fasteners to drive, more positive and permanent attachment. And savings in the high and ever-climbing cost of labor and callbacks easily return the extra cost of USG Screws: under $10 for a typical single-family house—less than one hour's labor time, and a fraction of the cost of one callback.

Savings are based upon substituting USG Type W Screws for nails in panel field only, but continuing to nail around panel perimeter—for an average-size house of 1,500 sq. ft., with rooms averaging 12 x 16 ft. This practice, while not ideal, is often followed for practical reasons of easy panel handling during initial attachment, and nail pops rarely being noticeable under taped joints or at inside corners. Since minimum spacing for USG Screws is 16″ o.c. in both ceiling and wall panels, compared to 7″ and 8″ for nails, the combination nail/USG Screw attachment effects a 31% reduction in the number of ceiling and wall fasteners (with standard 16″ stud spacing).

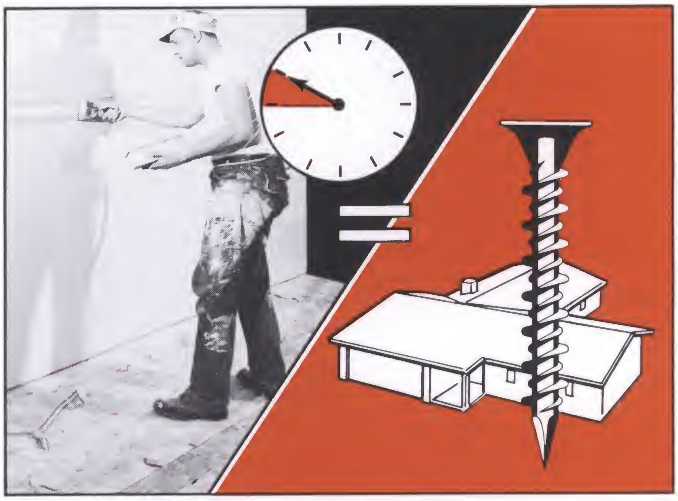
The best job, and fastener economics, result from *full* substitution of USG Screws for drywall nails, which eliminates 43% of fasteners, and greatly reduces joint compound and spotting of fastener heads—a substantial reduction in total labor time.



On wall or ceiling, gypsum panels install speedily and permanently with USG Type W Screws.



USG Screws protect panel paper, minimize most problems from natural wood defects–rarely "pop".



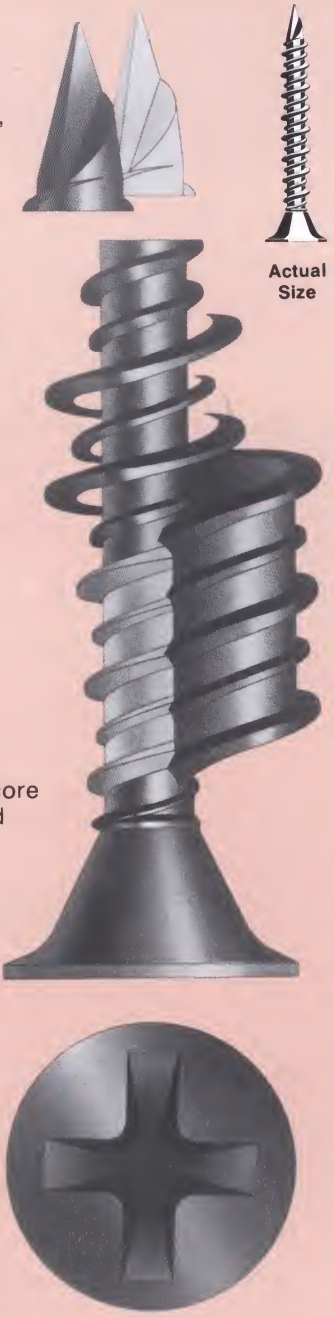
- **Labor is expensive—only one hour buys USG Screws for an entire house**
- **Callbacks are expensive—$15 to $40 each**
- **Reputations are priceless—built slowly, with quality**

Recent surveys have established that major contractors, using even the combination nail/USG Screw attachment described above, virtually eliminate callbacks due to nail pops and other fastener deficiencies.

anatomy of performance

USG Drywall Screws

Check the patented features and latest screw technology, part-by-part, that give 1¼″ USG Type W Bugle Head Drywall Screws their superior performance:



Point
Self-drilling slotted nail point to minimize, splitting and assure easier direction control, with a minimum of pressure.

Threads
Special patented high/low combination to provide quicker driving with less pressure, and greater resistance to strip-out. The higher thread cuts quickly with ease; lower thread helps hold alignment, compresses material more tightly for greater pullout strength.

Head
Bugle shape for dual purpose: (1) eliminate tearing at head perimeter by folding face paper under, into cavity left by shank, (2) compress gypsum core downward and outward for greater holding—instead of shearing through, as a flat head would do.

Face
Flat, with deep, sharply formed Phillips-type slot, to mate with closely-fitting USG Bit Tip. With electric screwgun, the USG Bit Tip and an adjustable depth locator assure proper driving depth, positive control, and eliminate spinouts and droppers.

Finish
Specially coated to prevent rust and provide excellent bond.

architectural specifications

note to architect

These abbreviated specifications cover the use of USG Type W Drywall Screws, exclusively or in combination with GWB-54 nails, for gypsum panel attachment to wood framing. For additional information, and complete specifications on wood-framed drywall assemblies, see U.S.G. Architectural Technical Folders SA-924 on SHEETROCK Gypsum Panels & Wood Framing, SA-927 on SHEETROCK Gypsum Panels & Accessories, and SA-913 on Veneer Plasters & Wood Framing.

Part 1: general

1.1 scope—*Specify to meet project requirements.*

1.2 qualifications
All materials, unless otherwise indicated, shall be manufactured by United States Gypsum Company, and shall be installed in accordance with its current printed directions.

1.3 delivery and storage of materials
All materials shall be delivered in their original unopened packages and stored in an enclosed shelter providing protection from damage and exposure to the elements. Damaged or deteriorated materials shall be removed from the premises.

1.4 environmental conditions
During gypsum panel application and joint finishing in cold weather, temperatures in the building shall be maintained between 50° and 70°F. Adequate ventilation shall be provided to carry off excess moisture.

Part 2: products

2.1 materials

a. Drywall Screws: 1¼″ USG Type W.

b. Drywall Nails: (length) (type) (conforming with "Recommended Performance Standards for Nails for Gypsum Wallboard", adopted by the Gypsum Association and the Gypsum Drywall Contractors International) (as specified in fire-resistive construction).

Part 3: execution

3.1 fastener application

a. USG Type W Screws—Power-drive with an electric screwdriver at 2,500 rpm max., so screwheads provide a slight depression below surface of gypsum panels without breaking face paper. Do not drive screws closer than ⅜″ from edges and ends of board. Space screws at 16″ on walls and ceilings, for framing 16″ o.c., 12″ on ceilings and 16″ o.c. on walls for framing 24″ o.c., in either perpendicular or parallel application.

b. Nails—Drive nails with heads slightly below gypsum panel surface in a dimple formed by crowned face of hammer. Drive nails no closer than ⅜″ from edges and ends of panel.

Note: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

Note: Products described here are covered by one or more of following U.S. patents: Nos. 2,871,752; 3,056,234; 3,125,923; 3,204,442; 3,207,023; 3,221,588; 3,260,100.

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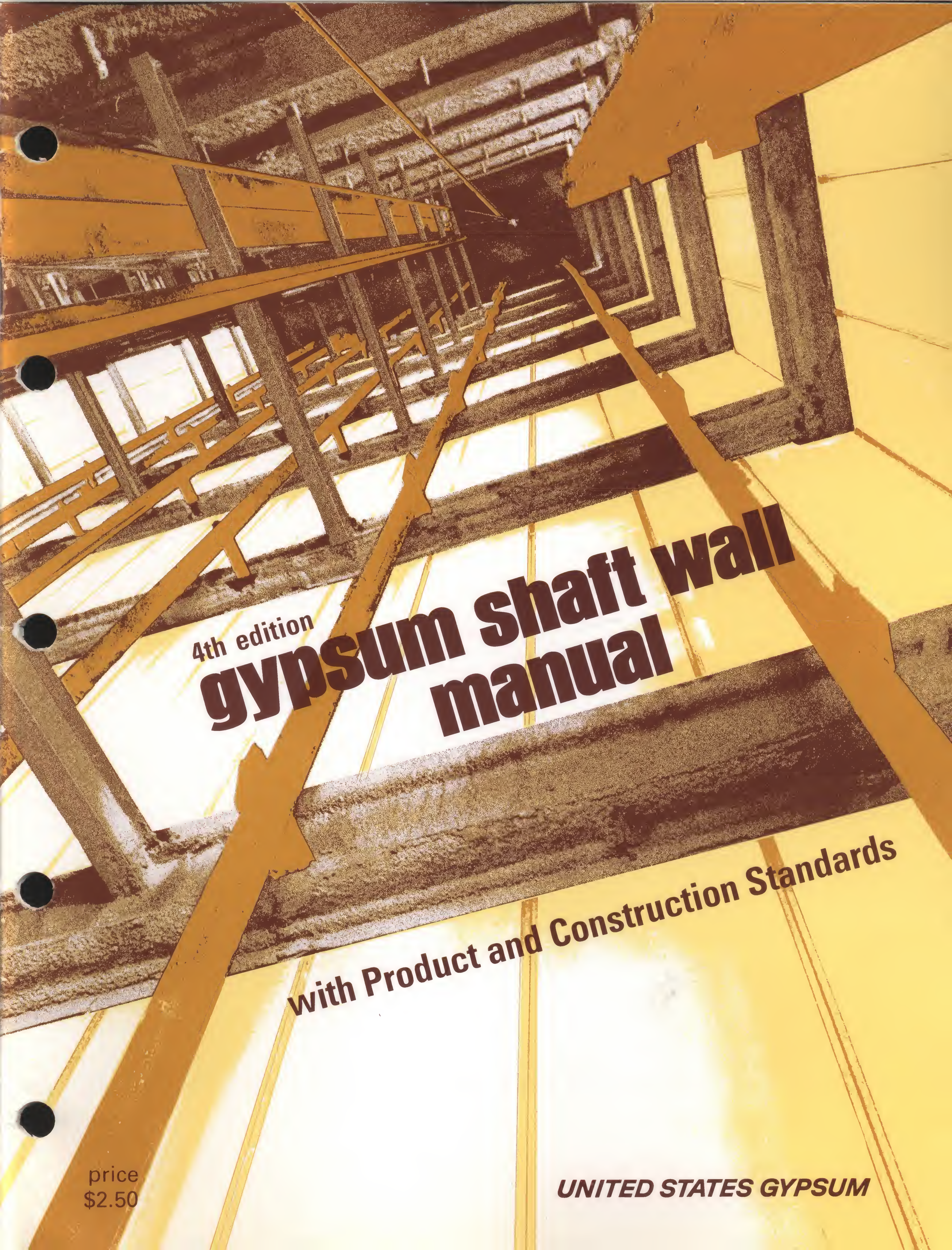

4th edition

gypsum shaft wall manual

With Product and Construction Standards

price
$2.50

UNITED STATES GYPSUM

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USG shaft wall manual

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development of shaft walls

When the need for elevator, stairwell and air shafts became apparent, shaft walls were designed using construction materials such as concrete block, tile and brick. These walls performed satisfactorily in most installations but were costly, added much extra weight to the building and required extensive materials handling.There were delays due to moisture of construction, trade conflicts, union restrictions, material deliveries and storage requirements.

In recent years, the trend toward taller buildings has accentuated the need for lower-cost, lightweight dry systems that can reduce material handling yet meet required fire and sound ratings. High-speed elevators needed for such buildings create greater pressures in the shafts which can weaken masonry structures. This impairment of the shaft structure can reduce its fire-protection effectiveness.

design criteria

Elevator shaft walls differ from conventional partitions in that many are "working walls" and must be capable of withstanding flexural stresses produced by continuous cycling under positive and negative air pressures.

In most instances, interior partitions need not be designed to withstand lateral loads greater than 5 psf. Shaft walls, however, must resist air pressures up to 15 psf created by high-speed elevator cabs moving in the shafts.

U.S.G. engineers measured shaft pressures to confirm design criteria for buildings such as Hancock Center, First National Bank and U.S.G. Corporate Headquarters in Chicago. These design requirements also applied to buildings with fewer stories but also using high-speed elevators. A system then had to be designed to withstand pressures that had literally blown concrete block from masonry shaft walls.

Other factors influence shaft wall design. Weight of the wall and its impact on structural steel requirements is a critical cost factor. Assembly should be fast and accomplished without need for excessive scaffolding. In addition, assembly of metal components and the hardness of some components must be such that continuous cycling of the wall through its allowable deflection does not produce "metal fatigue" and failure.

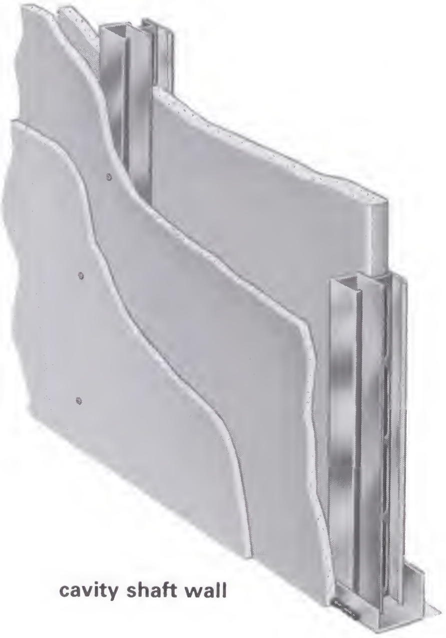
Local codes may consider shaft walls in the same class as standard interior partitions and allow deflections up to 1/120. U.S.G. recommends a maximum deflection limitation of 1/240 since shaft walls must withstand greater flexural movements resulting from elevator use. This criterion is not restrictive considering the fact that a deflection of 1/120 on a 12-ft. wall would result in a total lateral movement of over 2 in.

Extensive studies of these and other design elements by independent engineers, architects and U.S.G. Research specialists have established the following standards for good shaft wall design. The system must: **1**) Resist lateral loading of 7½ to 15-psf air pressure. **2**) Deflect not more than 1/240 of the partition height under design load. **3**) Not exceed 15 psf dead load. **4**) Provide at least 2-hr. fire rating. **5**) Offer min. STC rating of 38. **6**) Employ fasteners for panels that provide safe attachment through one million maximum-deflection cycles. **7**) Accommodate 16-ft. ceiling heights. **8**) Erect from one side only. **9**) Produce minimum waste and require minimum clean-up, particularly within the shaft.

why USG shaft wall?

United States Gypsum, after extensive research and testing, developed a dry shaft wall system to meet or exceed basic requirements.

These lightweight, non-load bearing gypsum drywall assemblies are ideal for enclosing elevator shafts, stairwells and other vertical shafts in multi-story buildings. Rapidly installed from outside the shaft, these systems provide shaft enclosures that may be finished later along with interior partitions.



cavity shaft wall

USG Cavity Shaft Walls consist of USG Steel C-H Studs and J-Runners, USG Shaft Wall Liner Panels and SHEETROCK FIRECODE "C" Panels or IMPERIAL FIRECODE "C" Gypsum Base and Veneer Plaster. For maximum sound control, RC-1 SHEETROCK Resilient Channels are attached to steel studs, and double-layer gypsum panels are applied with THERMAFIBER Sound Attenuation Blankets installed in the cavity.

advantages

Shaft walls are used in office and institutional buildings, medium- and high-rise apartment complexes, and occasionally in industrial plants with high-risk separations. USG Shaft Walls have been specified in major construction projects throughout the U.S. because of their excellent design, code conformance and ease of installation.

Here are some specific advantages:

Engineered Performance—The systems have been designed and tested using accepted engineering practices with deflection criteria of 1/240 and 1/360 clear partition heights. A wide range of product and installation combinations is available to meet performance requirements: air pressure loading of 5, 7½, 10, and 15 psf; vertical heights to 15 ft. using 2½″ studs, with greater heights available for lobbies and mechanical rooms using 4″ studs. Stud design provides a vertical chaseway 1½″ deep and 22½″ wide for enclosing hangers, electrical conduit, etc.; also 1″ dia. holes 16″ from each end of stud for installation of horizontal conduit.

Fire Resistance—Ratings up to 4 hours.

Faster Completion, Earlier Occupancy—USG Shaft Walls erect easily using components and application procedures familiar to mechanics. System installs from each floor, leaving shaft free of scaffolding. Jobs move faster, schedules are more easily met and buildings can be finished and occupied sooner.

Economy—USG Shaft Walls utilize low-cost materials and a minimum number of components. The assemblies are lightweight, ranging from the exceptionally low 8 psf for the 1-hr. fire-rated design to 16 psf for the 4-hr. rated design. In high-rise buildings, USG Shaft Walls offer an opportunity for significant savings in structural framing costs and allow use of smaller foundations because of reduction in dead load.

Sound Control—The standard Shaft Wall assembly offers a 39 STC rating, 44 STC with 1″ THERMAFIBER Sound Attenuation Blankets. The double-layer assembly with RC-1 Resilient Channels and 1½″ Sound Attenuation Blankets has an STC rating of 51.

comparison with other systems

Design requirements of shaft walls result in particular advantages or disadvantages in various systems. The USG Shaft Wall System has proved to be one of the most practical and economical.

For example, in the two 110-story towers of New York's World Trade Building, there were 4 million sq. ft. of shaft walls. In masonry, these walls would have required 180 million lbs. of material to be delivered by truck, unloaded, hoisted, handled and erected. The USG Shaft Wall System was installed with a total weight of 40 million lbs., a saving of 140 million lbs. More recent improvements in shaft wall design would have decreased this total weight by another 12 million lbs.

The versatile USG Shaft Wall System–used here with glass to enclose mechanical floors–reduced construction costs on project.

Here are some specific comparisons with other systems:

1. Less thickness and weight than masonry construction.

2. Simplicity of construction. Steel studs and liner panels are put in place with no mechanical fasteners. All work can be done from outside the shaft with only the face panels screw-attached.

3. No screw penetration into shaft with E-studs. Several systems have screws projecting as much as ⅝″ to ¾″ inside the shaft which can present a safety problem.

4. Greater height versatility. Limiting heights to 28 ft.—more than other systems.

5. Air-leakage resistance to 50 psf—twice the established criteria.

Smoke shaft provides inside view of shaft wall construction.

6. No mechanical fasteners required with E-Studs—reduces flexing and eventual failure of runners and screws possible with competitive designs.

7. Withstands loadings of more than one million cycles with no failure of any components. Runners and screws in other designs failed at less than one million cycles.

8. Exceeds established fire-resistance requirements.

9. Possible sound ratings to 51 STC, highest of any shaft wall system.

10. Designed in full accordance with accepted engineering principles.

product standards

The products described and illustrated here are the basic materials recommended by United States Gypsum for shaft wall assemblies. For architectural details and specifications, see U.S.G. system folder SA-922 on Shaft Walls.

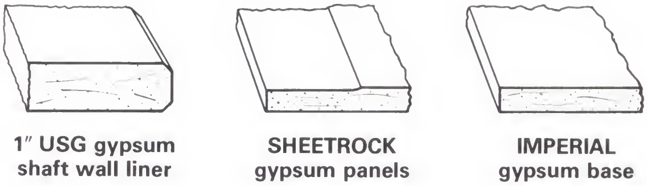
These materials are designed to meet the essential requirements of economy, speed of installation, strength, fire resistance and ease of decoration which are characteristic of quality drywall construction. They have been developed to achieve the optimum results based on extensive laboratory tests and job-proven performance. The United States Gypsum Company trademark is your assurance of proven product quality construction.

1. Gypsum Panels

a. **USG Shaft Wall Liner Panels** have a special fire-resistant gypsum core encased in multilayered moisture-resistant green paper. Panels are placed vertically with ends inserted into steel J-Runners attached to floor and ceiling with edges inserted between supporting flanges of steel C-H Studs, E-Studs or J-Runners. Panels are attached with 1⅝″ type S screws, 24″ o.c. vertically when J-Runners are used in place of E-Studs. Panels have beveled edges, are 1″ thick, 24″ wide and are available in lengths to 16 ft. Weight is approx. 4 psf. Also used for surface application in the 4-hr. system.

b. **SHEETROCK FIRECODE "C" Panels** are gypsum panels with a specially formulated fire-resistant core for fire-rated construction. Ivory manila face paper is suitable for paint or other decoration. Face panels are placed vertically and screw-attached over horizontally applied base panels for triple- or double-layer application, or direct to studs for single-layer application. For these systems, panels are ½″ or ⅝″ thick, 48″ wide and are available in lengths to 14 ft. Weight is approx. 2 psf for ½″, 2.5 psf for ⅝″ panel thicknesses.

c. **IMPERIAL FIRECODE "C" Gypsum Base** is a special large-size gypsum lath with a high-strength, high-density core, designed especially for use with high-strength veneer finishes in fire-rated construction. It is faced with blue paper that provides optimum suction for the plaster. Panels are placed vertically and screw-attached over horizontally applied IMPERIAL Base for double- or triple-layer application or direct to studs for single-layer application. For these systems, panels are ½″ or ⅝″ thick, 48″ wide and are available in lengths to 12 ft. Weight is approx. 2 psf for ½″, 2.5 psf for ⅝″ thicknesses.



2. Framing Members

Structural accessories for these systems are formed from hot-dipped galvanized steel meeting ASTM A446-67, Grade A with min. G60 zinc coating. Items are color-coded at the factory to indicate style as follows: *5–white, 7–green; 8–blue; 10–red. Obtain style designation from architect's specifications or drawings.*

a. **USG Steel C-H Studs** are non-load bearing sections which are installed between abutting Shaft Wall Liner Panels. C-H Studs are available in 2½″ and 4″ widths, in lengths as required, with style-designation code printed every 24″ for easy identification.

weight—lbs./MLF

style	2½″	4″
212CH5	604	—
212CH8	862	—
400CH5	—	716
400CH10	—	1,217

b. USG Steel E-Studs are non-load bearing E-shaped sections which are used at filler panels, door jambs, terminals, intersections and corners. E-Studs are available in 2½″ and 4″ widths, in lengths from 8 to 28 ft.

weight—lbs./MLF

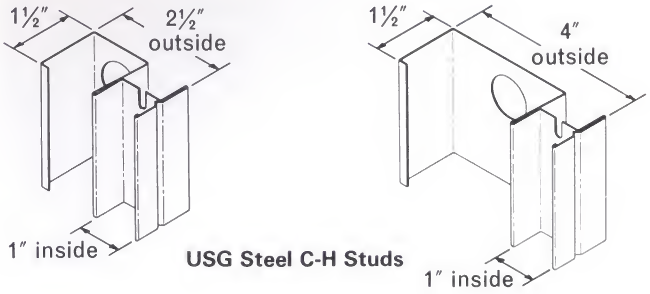
style	2½″	4″
212ES5	517	—
212ES10	807	—
400ES5	—	684
400ES10	—	1,067

c. USG Steel J-Runners are J-shaped sections used as floor and ceiling runners and as vertical members at elevator door jambs, terminals, intersections and corners. Also used to frame openings cut within a panel. Runners are 2½″ and 4″ wide; standard length is 10 ft.

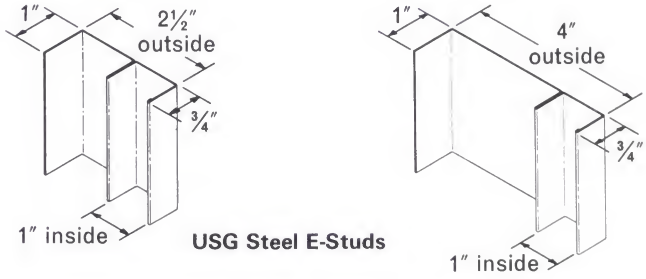
weight—lbs./MLF

style	2½″	4″
212JR7	525	—
400JR7	—	1,110

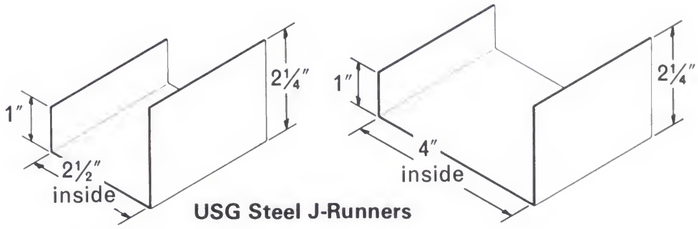
steel components—cavity shaft walls



USG Steel C-H Studs



USG Steel E-Studs



USG Steel J-Runners

3. Plastering Materials

a. Veneer Plaster and Finishes

(1) IMPERIAL Finish Plaster—*applied 1/16″ to 3/32″ thick single-coat system.*

(2) IMPERIAL Basecoat Plaster—*applied 1/16″ to 3/32″ thick in two-coat system; select finish from (b) below.*

(3) DIAMOND Interior Finish—*applied 1/16″ thick in single-coat system.*

b. Finish Plasters—applied 1/16″ thick

(1) IMPERIAL Finish Plaster.

(2) STRUCTO-GAUGE Gauging Plaster and IVORY Lime (1:1 or 1:2).

(3) RED TOP Keenes Cement and IVORY Lime (4:1 or 2:1).

(4) DIAMOND Interior Finish.

4. Fasteners—USG Brand Screws

a. 1″, 1¼″; 1⅝″, 2¼″ Type S, bugle head.

b. ⅜″ Type S and S-12, pan head.

5. Insulation

THERMAFIBER Sound Attenuation Blankets are paperless, semi-rigid mineral fiber mats which are installed in stud cavities of USG Shaft Wall for substantially improved STC rating. For these systems, blankets are 1″ or 1½″ thick, 24″ wide and 48″ long.

THERMAFIBER Mineral Fireproofing is a noncombustible, semi-rigid felt used to provide a fast, clean, inexpensive method for protecting large steel columns and spandrel beams. Felt is 2″ and 2½″ thick, 24″ wide and 48″ or 60″ long. Attached either with 12-ga. wire snap-on flange clips and 1½″ diam. clinch shields or with ⅛″ diam. cap-type steel studs welded through fireproofing.

6. Drywall Accessories

a. Corner Bead—DUR-A-BEAD, No. 800.

b. USG Metal Trim—Nos. 200A, 200B, 401, 402, 801A, 801B.

c. USG Control Joint No. 093.

d. USG Metal Furring Channel.

e. RC-1 SHEETROCK Resilient Channel.

7. Lathing Accessories

a. USG Control Joint No. 093.
b. USG Corner Bead No. 800.
c. USG Metal Trim No. 801A, 801B.

8. Joint Treatment

a. PERF-A-TAPE Reinforcement.
b. Joint Compound
    (1) DURABOND Joint Compound—90, Taping, Topping, All Purpose.
    (2) USG Joint Compound—Taping, Topping, All Purpose.
    (3) USG Ready-To-Use Joint Compound—Taping, Topping, All Purpose.

9. Caulking Compound

USG Acoustical Sealant.

10. Materials by Other Manufacturers

Runner fasteners should be a power-driven type with ability to withstand 193 lbs. single shear and 200 lbs. bearing force when driven into structural head or base and without exceeding allowable stress in runner, fastener or structural support. Self-tapping ½″ USG Brand Type S-12 Pan Head Screws may be used for runner attachment to a continuous metal fastening plate embedded in structural concrete. Suitable fastener types and sizes are shown in the following table:

runner track anchors

type	sizes—in.
Power-driven anchors	
For concrete	5/32 diam., 1¼ long
For steel	5/32 diam., ½ long
USG Brand Type S-12 Pan Head Screws	½ long
Threaded bolts and nuts	⅜ diam.

construction standards

Job Safety—Gypsum drywall construction is usually classed as nonhazardous; but since shaft walls are erected next to open vertical shafts using somewhat heavier materials, and may require work from within the shaft, certain precautions should be taken to prevent accidents. Consult local, state and federal regulations for details.

Materials Handling—In high-rise buildings, time and money savings can be substantial when proper materials handling methods are used. Contact your U.S.G. representative for help in developing methods best suited to particular job conditions.

Job Storage—Shaft wall materials should be stored inside under cover and should remain in their wrappings or containers until ready for actual use. Gypsum panels should be stacked flat on a clean floor preferably near the location where they will be used.

Job Conditions—USG Shaft Wall Liner in shaft wall assemblies may be erected, as construction schedules require, and used as temporary shaft enclosures. Once erected, panels should be protected from exposure to moisture and the elements. If panels become wet, they must be allowed to dry thoroughly before face layers are applied or joints treated.

When the outdoor temperature is below 55° F., heat should be maintained in the building continuously and uniformly at not less than 55° F. from one week prior to beginning of joint treatment until gypsum panel application and joint treatment is completed. Joint treatment should not be started until windows are glazed and doors are installed unless openings are temporarily closed. Adequate ventilation should be provided to remove excess moisture during this period.

Advance Planning can mean savings in time and costs and point the way to the most effective use of materials. By looking ahead to the procedures used by other trades on the job, how they affect the installation of the shaft wall can be foreseen. The job superintendent should appraise the project early and, perhaps, suggest a meeting with the general contractor to coordinate the work sequence.

Special Situations—Certain shafts should not be enclosed until the mechanical work is completed and tested. Two or three walls can be erected to move the job along, but the other two walls will have to be completed later. Although USG Shaft Walls are primarily designed for installation from the slab side, some walls will require work from the scaffolding over or inside the shaft.

1. In toilet areas adjacent to the shaft it is advisable to install the gypsum panels ahead of the plumbing and return later to add the furred facing after the piping is in. If piping is installed before shaft wall goes up, mechanics may have to work from shaft side to erect the shaft wall, making the task more difficult and time-consuming.

2. To reach walls buried in the shaft, scaffolding is generally required. In this case, it is better to complete the entire shaft wall while crews are in the shaft. Usually, however, finish layers of board are installed and joints finished much later in the project.

3. Location of handrail support brackets should be determined so provision can be made for anchorage in the wall.

Similar consideration should be given to anchorage for toilet partitions on furred shaft walls.

4. **Check door frame throat openings** to be sure the shaft wall can be inserted; also check door frames for anchor clips for attachment of strut studs.

5. **Bracket supports for pipes and ducts** are normally located on top of the slab or beam. They should be located or held back to clear the runner track or coreboard panel.

Layout—Properly position shaft wall location according to the partition layout. Snap chalk lines at ceiling and floor. Be certain shaft wall will be plumb.

System Installation—The installation of major components of the systems is described and illustrated on the following pages together with recommended application procedure and limitations.

Installing floor runner

Placement of studs

Placement of panels

Capping panel with stud

erection—
USG cavity shaft wall system

Runner Tracks

Position steel runners at floor and ceiling with the short leg toward finish side of wall. Securely attach runners to structural supports with power-driven fasteners at both ends and 24″ o.c. With steel frame construction, install runners and E-studs on columns and beams before steel is fireproofed.

Steel Studs

Cut C-H Studs, E-Studs and J-Runners used vertically ⅜″ to not more than ½″ less than floor-to-ceiling height so as to engage short leg of J-Runner. Use E-Studs or J-Runners as vertical members over edge of liner board panels where shaft wall abuts columns, at T-intersections, corners and doors jambs. Install E-Studs over both long panel edges of closure panels and on abutting edges of both adjacent panels.

Shaft Wall Liner

Cut liner panels 1″ less than floor-to-ceiling height to allow tilting into place when inserted into floor runners. With panel top held against back flange of ceiling runner, insert panel edge fully into E-Stud groove, tightly abutting the web. When J-Runners are used, attach liner to runner flange with 1⅝″ screws spaced 24″ o.c. Where shaft walls exceed 14 ft. in height, position liner panel end joints within the upper and lower third points of wall. Stagger joints top and bottom in adjacent panels to prevent a continuous horizontal joint.

Openings

Use J-Runners to frame openings cut within liner panels. For openings up to 48″ wide, frame with vertical E-Studs or J-Runners at edges, horizontal J-Runners of same gauge at head and sill. Attach vertical and horizontal J-Runners to web of studs with clip angles and ⅜″ type S or S-12 screws as shown on drawings. Refer to architect's details for framing openings wider than 48″.

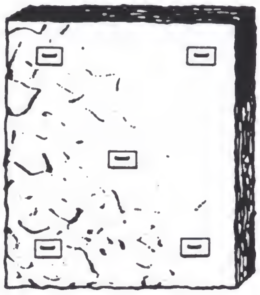
Hinged Door Frames

Install floor-to-ceiling-height 2½" or 4" E-Studs each side of steel hinged door frames and J-Runners or E-Studs each side of elevator door frames to act as strut-studs. Attach strut-stud to floor and ceiling runners with ⅜" type S-12 pan head screws. Over metal doors, install a cut-to-length section of 2½" or 4" J-Runner and attach to adjacent studs with clip angles and ⅜" type S-12 screws (see details, page 12).

Spot-grout all one-piece frames at quarter points after studs and liner panels are in place. Apply DURABOND or USG Ready-To-Use Joint Compound, sanded RED TOP Gypsum Plaster or STRUCTO-LITE Plaster just before inserting gypsum face panel into frame. Do not terminate panels against trim return. Refer to architect's details for additional strut-stud bracing at the strike jamb, which is recommended for hinged door frames and is required for heavy (over 50 lbs.) or oversize (more than 36" wide) doors.

Insulation

Install THERMAFIBER Sound Attenuation Blankets between studs of cavity shaft walls. Fit blankets carefully to fill entire height of stud cavity. Attach blankets to liner panels using 9/16" divergent-point staples, driven through pieces of PERF-A-TAPE Reinforcement, placed at each corner and in the center of each blanket.



Gypsum Face Panels

1. Resilient—Attach RC-1 Resilient Channels horizontally to face of studs with ⅜" type S or S-12 screws driven through holes in mounting flange. Space channels within 3" of floor and ceiling and max. 24" o.c. Extend channels to all corners and attach to corner framing. Splice channels by nesting directly over stud. Screw-attach through both flanges and reinforce with screws at both ends of splice.

Apply ⅝" SHEETROCK FIRECODE "C" Panels or IMPERIAL FIRECODE "C" Gypsum Base horizontally to resilient channels with end joints staggered. Fasten with 1" or 1¼" type S screws 12" o.c. (space fasteners to within 6" of, but not over, C-H Studs). Attach face layer vertically to channels with 1⅝" type S screws 12" o.c. Stagger joints.

2. Triple Layer—Erect base layer ⅝" SHEETROCK FIRECODE "C" Panels or IMPERIAL FIRECODE "C" Gypsum Base vertically to face of studs. Install mid-layer horizontally and face layer vertically with joints staggered. Attach base-layer panels to studs with 1" screws 24" o.c., mid-layer with 1⅝" screws o.c., and face layer with 2¼" screws 16" o.c. Also attach face panels to J-Runners with 2¼" screws 12" o.c.

3. Double Layer—Where only one side of the shaft wall is to be finished (elevator and mechanical shafts, etc.) erect ½" SHEETROCK FIRECODE "C" Panels or IMPERIAL FIRECODE "C" Gypsum Base vertically over one side of studs. Fasten base-layer panels to studs with 1" type S screws spaced 24" o.c. at edges and in field.

Apply second layer of ½" panels vertically. Stagger edge joints in face layer from edge joints in base layer. Attach face-layer panels with 1⅝" type S screws staggered from those in the base, spaced 12" o.c. at edges and in field, and driven into the studs.

4. Single Layer—Where both sides of the shaft wall are to be finished, as in stairwells, erect ½" SHEETROCK FIRECODE "C" Panels or IMPERIAL FIRECODE "C" Gypsum Base vertically on both sides of studs. Stagger edge joints on opposite sides of wall and attach panels with 1" type S screws spaced max. 12" o.c. in the field and 12" along vertical abutting edges. Stagger screws on abutting edges.

Veneer Plaster

1. Single-Coat System—Apply IMPERIAL Finish Plaster or DIAMOND Interior Finish.

2. Two-Coat System—Apply IMPERIAL Basecoat Plaster, then apply finish coat of IMPERIAL Finish Plaster, STRUCTO-GAUGE Gauging and IVORY Lime, RED TOP Keenes Cement and IVORY Lime, or DIAMOND Interior Finish.

Accessories

1. Gypsum Panel Joints—Finish all face-layer joints and internal angles with DURABOND or USG Joint System applied according to manufacturer's directions. Spot exposed fasteners on face layers and finish corner bead, control joints and trim as required, with at least three coats of joint compound, feathered out onto panel faces and sanded smooth.

2. Gypsum Base Joints—Treat all gypsum base joints, internal corners, trim and corner bead with DURABOND Joint System applied according to manufacturer's directions. Allow to dry before finish plaster application.

3. Corner Bead—Reinforce all vertical and horizontal exterior corners with corner bead fastened with staples 9" o.c. on both flanges along entire length of bead or with clinching tool.

4. Metal Trim—Where shaft wall terminates against masonry or other dissimilar material, apply metal trim over face layer edge. Fasten with screws or staples spaced 12" o.c.

5. Screws—Power-drive at least ⅜" from edges or ends of gypsum panels to provide uniform dimple 1/32" deep. In gypsum base, set head flush with surface of panel without tearing face paper.

6. Control Joints—Break face layer behind joint. Attach control joint to face layer with staples spaced 6" o.c. on both flanges along entire length of joint.

7. Resilient Channels—Attach horizontally to face side of studs with 3/8" type S-12 screws through holes in mounting flange.

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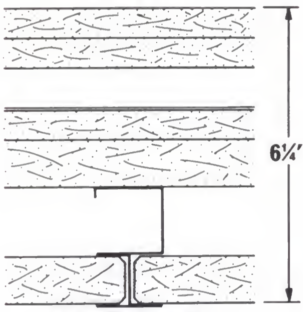
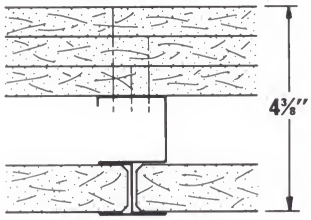
system details

double layer



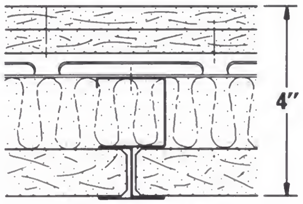
4 Hr. Estimated
Based on U of C 5-24-74

triple layer

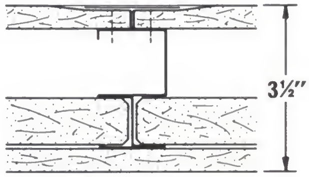


3 Hr. Estimated
Based on U of C 2-16-72

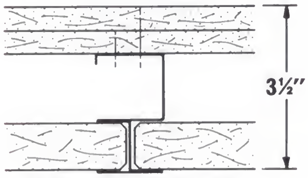
resilient layer



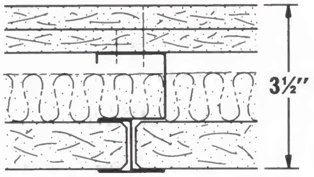
2 Hr. Estimated
51 STC—BBN-750412



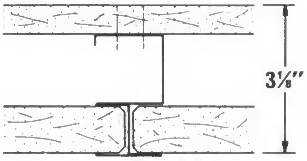
2 Hr.—U of C 6-23-75
39 STC est.



2 Hr.—U of C 3-4-75
2 Hr.—U of C 3-5-75
39 STC USG-750302

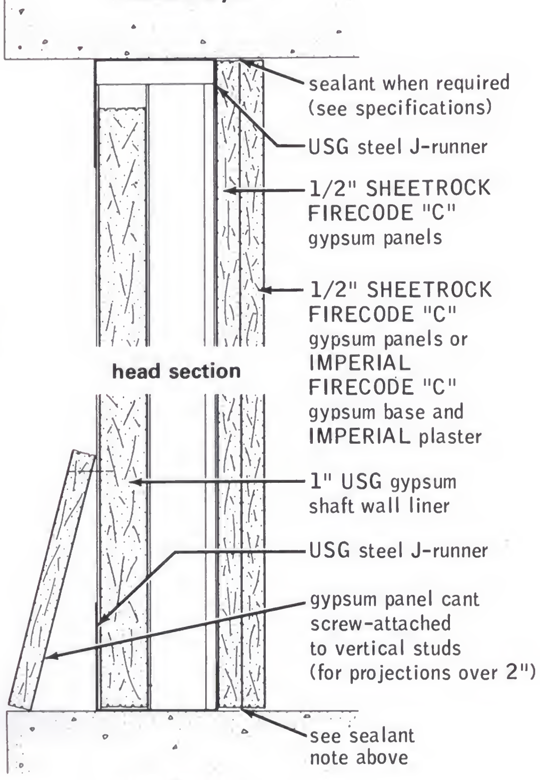


2 Hr. Estimated
47 STC—BBN-750706
Based on U of C Tests w/o Insulation

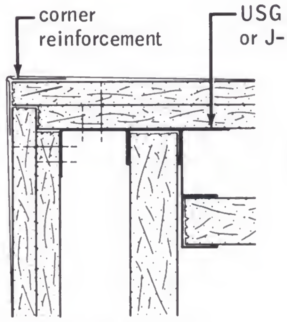


1 Hr.—U of C 3-6-75
1 Hr.—U of C 3-7-75

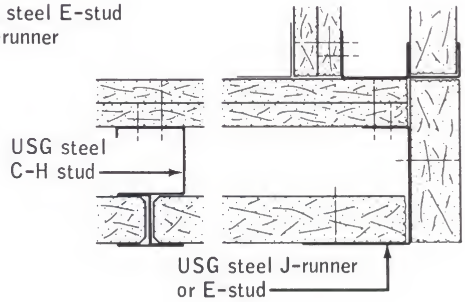
double layer


sealant when required (see specifications)
USG steel J-runner
1/2" SHEETROCK FIRECODE "C" gypsum panels
1/2" SHEETROCK FIRECODE "C" gypsum panels or IMPERIAL FIRECODE "C" gypsum base and IMPERIAL plaster
head section
1" USG gypsum shaft wall liner
USG steel J-runner
gypsum panel cant screw-attached to vertical studs (for projections over 2")
see sealant note above

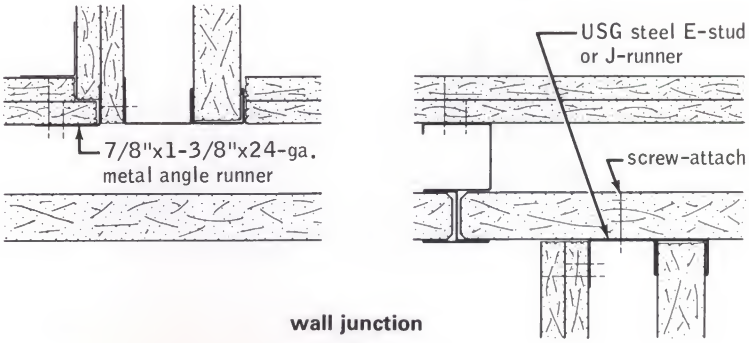
base section



outside corner

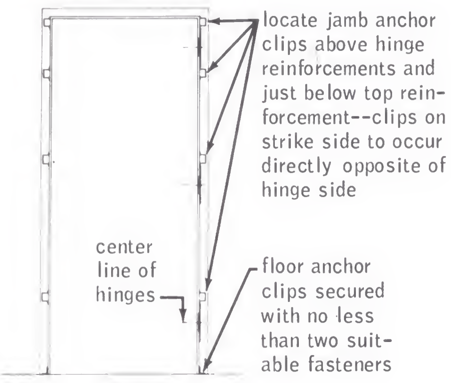


inside corner

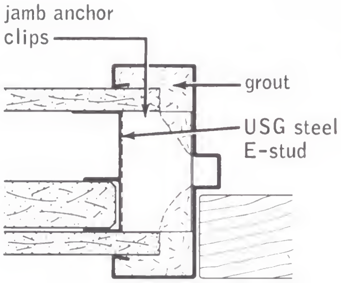

7/8"x1-3/8"x24-ga. metal angle runner
USG steel E-stud or J-runner
screw-attach

wall junction

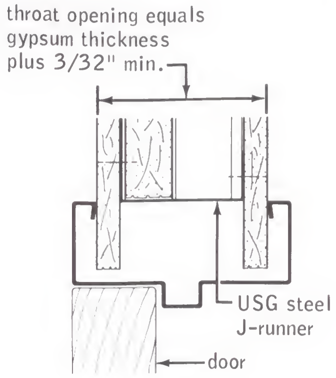
Hinged Doors


locate jamb anchor clips above hinge reinforcements and just below top reinforcement--clips on strike side to occur directly opposite of hinge side
center line of hinges
floor anchor clips secured with no less than two suitable fasteners

cross section thru frames

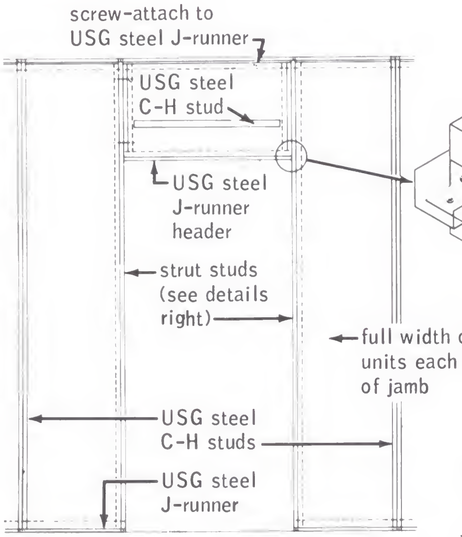


hinged door jamb

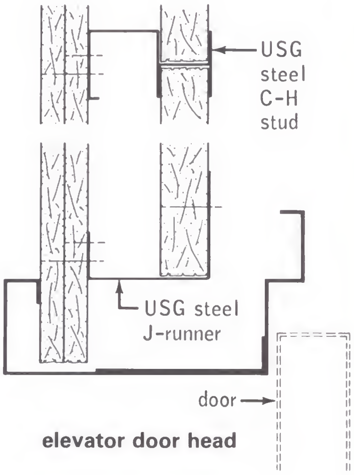


hinged door head

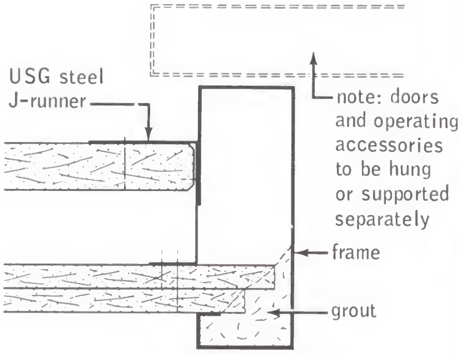
Elevator Doors


screw-attach to USG steel J-runner
USG steel C-H stud
USG steel J-runner header
strut studs (see details right)
full width core units each side of jamb
USG steel C-H studs
USG steel J-runner

rough door opening



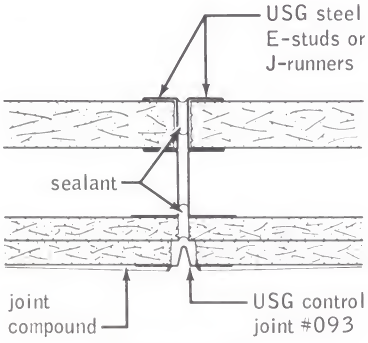
elevator door head


USG steel J-runner
note: doors and operating accessories to be hung or supported separately
frame
grout

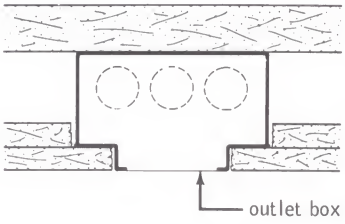
elevator door jamb

Shaft area is rapidly closed in, providing safety for following trades.

Miscellaneous Details



control joint



outlet box

special applications

Electrical Fixtures

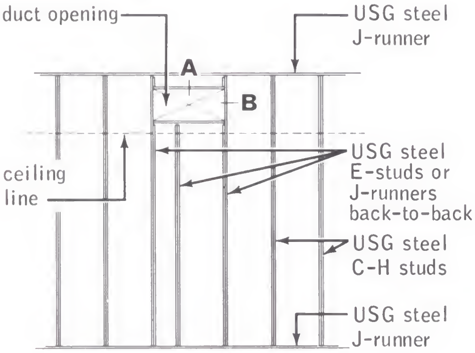
Work schedules should be coordinated to insure that electrical conduit and fixtures are installed after erection of studs and liner panels but before application of gypsum face panels. Install outlet boxes as detailed, page 12.

Duct Penetration

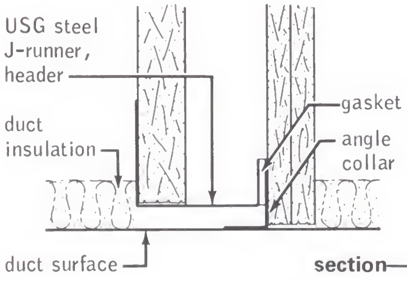
When panels are installed after ducts or duct stubs are in place, erect rough framing of floor-to-ceiling height E-Studs as strut-studs and J-Runner as header the same as for door frames. Install additional J-Runner to hold top of panels below duct.

When penetration for duct is cut after liner panels are installed, rough framing at header and sill must extend between nearest floor-to-ceiling height C-H or E-Studs. Cut J-Runners to fit between vertical studs and install header and sill to hold cut liner panels. Install panels with E-Studs at each vertical edge as filler panel on one or both sides of duct.

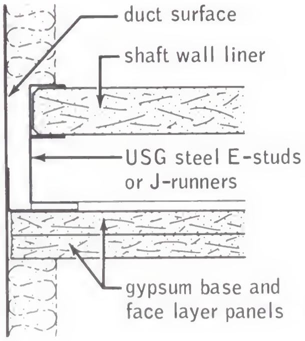
typical duct penetration



elevation at duct opening



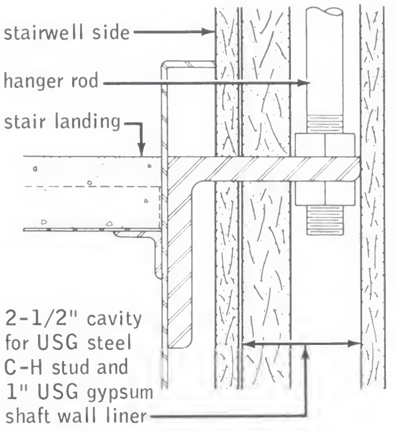
section—A


duct surface
shaft wall liner
USG steel E-studs or J-runners
gypsum base and face layer panels

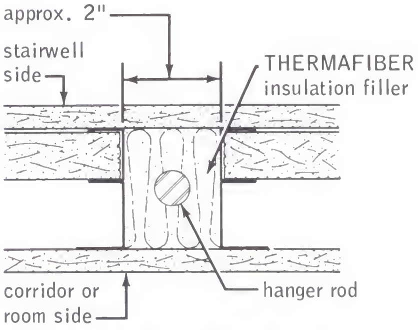
section—B

Stair Hanger

Install shaft walls so that stair hangers are concealed by the face layers. Allow about 2″ vertical space between liner panels for hanger rod. Install vertical E-Studs or J-Runners over panel edges each side of opening. Stuff cavity with insulation. Back with gypsum panels on shaft side or install single-layer panels each side as required.


stairwell side
hanger rod
stair landing
2-1/2" cavity for USG steel C-H stud and 1" USG gypsum shaft wall liner

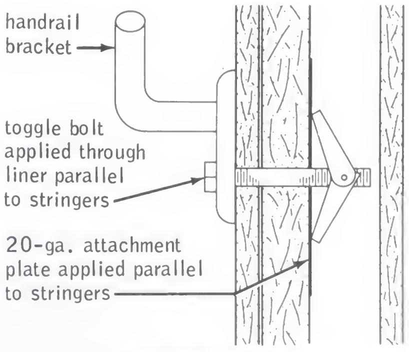
stair hanger rod application



cross section at stair hanger

Handrail Brackets

Stairwells usually require additional gypsum panel facing as an interior finished surface. Because of this the location of brackets should be clearly specified to permit proper positioning of bracing and fasteners.

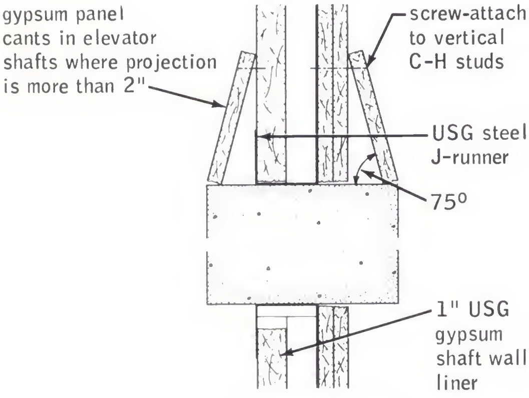

handrail bracket
toggle bolt applied through liner parallel to stringers
20-ga. attachment plate applied parallel to stringers

handrail application

Installation of handrail brackets using elevator bolts is preferred because it is stronger. Apply bolts with head behind liner panels and 20-ga. galvanized sheet metal reinforcing. As an alternate, bracket may be installed with 1⅝″ Type S screws driven into studs or 20-ga. galvanized sheet metal insert placed between studs and parallel to stringers.

Elevator Shaft Cants

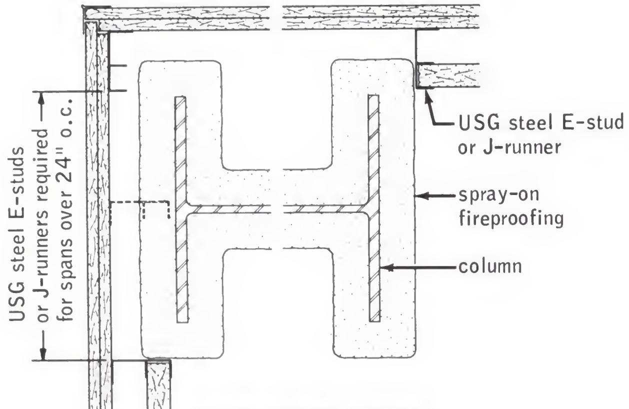
Cants are required in elevator shafts having horizontal projections of more than 2″. Where specified, install strips of ½″ gypsum panel at approximately a 75° angle and firmly screw-attach top of strips to C-H and E-Studs or vertical J-Runners used as studs.


gypsum panel cants in elevator shafts where projection is more than 2"
screw-attach to vertical C-H studs
USG steel J-runner
75°
1" USG gypsum shaft wall liner

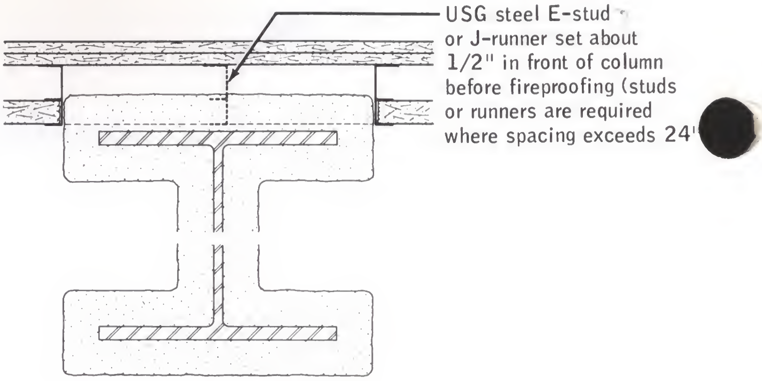
concrete beam

Framing Around Columns

Ideally the layout of the shaft wall should pass around column or the finished layers of SHEETROCK or IMPERIAL Base should pass by the columns. Structural elements should be fireproofed separately without relying on shaft walls to provide partial fireproofing. Isolate gypsum panel surfaces from all structural elements except the floor. Supports no greater than 24″ o.c. should be provided for the panels. Do not rigidly attach panels to columns, beams, shear walls, etc.


USG steel E-studs or J-runners required for spans over 24" o.c.
USG steel E-stud or J-runner
spray-on fireproofing
column

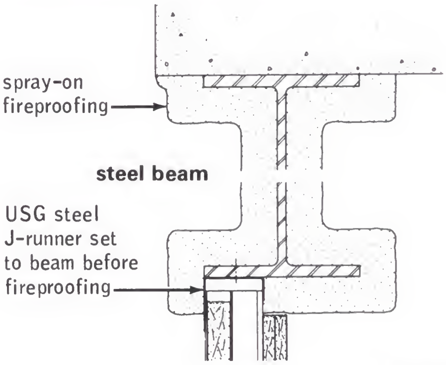
corner column bypass

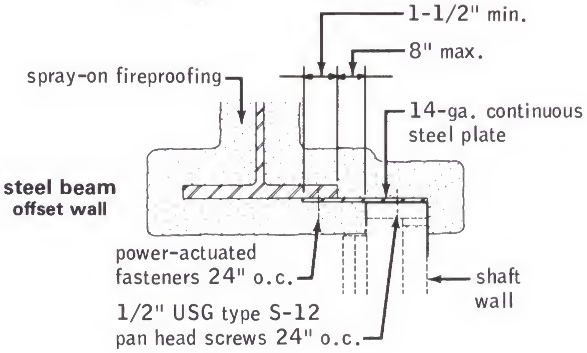

USG steel E-stud or J-runner set about 1/2" in front of column before fireproofing (studs or runners are required where spacing exceeds 24")

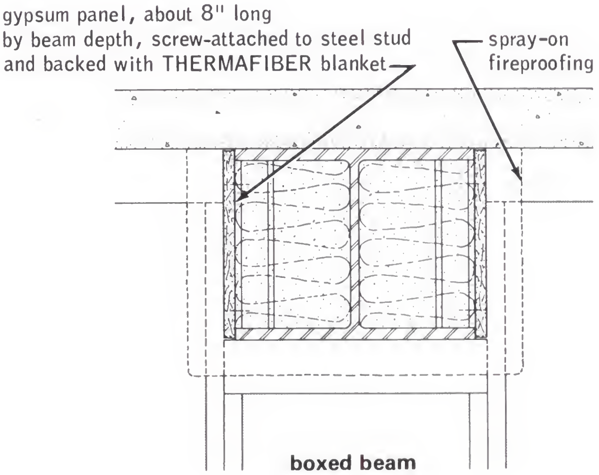
column bypass

Framing Around Beams

Attach USG Steel J-Runners to beam, then apply spray-on fireproofing as required.



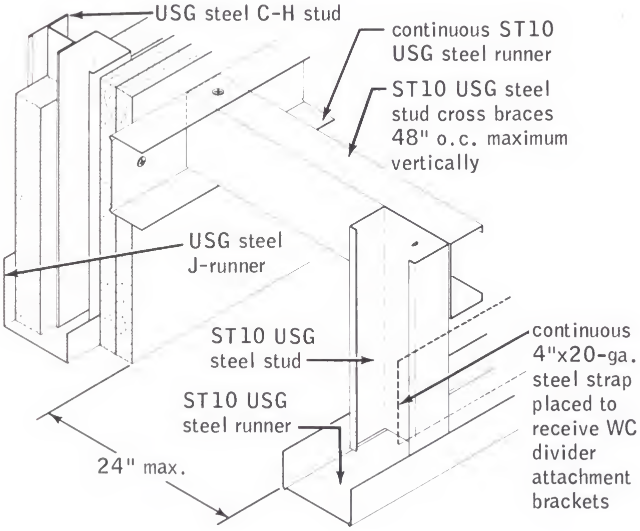

1-1/2" min.
8" max.
spray-on fireproofing
14-ga. continuous steel plate
steel beam offset wall
power-actuated fasteners 24" o.c.
shaft wall
1/2" USG type S-12 pan head screws 24" o.c.


gypsum panel, about 8" long by beam depth, screw-attached to steel stud and backed with THERMAFIBER blanket
spray-on fireproofing

boxed beam

Chase Walls

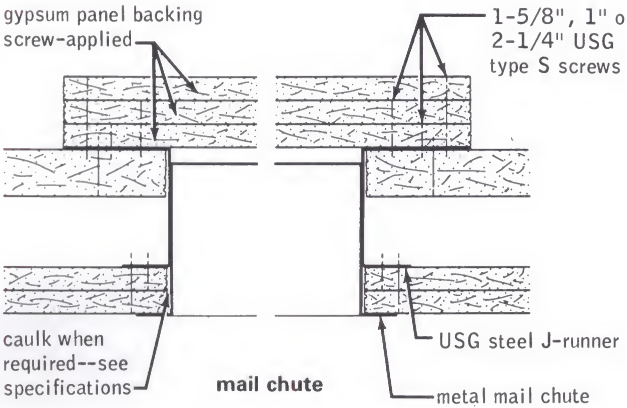
Plumbing chases are easily provided in toilet areas by installing a separate style-10 steel stud interior partition with gypsum panel facing one side. Install style-10 steel stud bracing to secure the studs to the shaft wall. Apply continuous 4"x20-ga. galvanized sheet metal strips over the studs for anchoring toilet partitions. Use SHEETROCK W/R (water-resistant) Panels as a base for ceramic, metal and plastic wall tile.


USG steel C-H stud
continuous ST10 USG steel runner
ST10 USG steel stud cross braces 48" o.c. maximum vertically
USG steel J-runner
ST10 USG steel stud
continuous 4"x20-ga. steel strap placed to receive WC divider attachment brackets
ST10 USG steel runner
24" max.

metal stud chase wall

Mail Chute

Install floor-to-ceiling-height J-Runners over liner panels on either side of mail chute opening. Apply gypsum panel strips from shaft side, screwing each layer securely into 2¼" J-Runner flange.

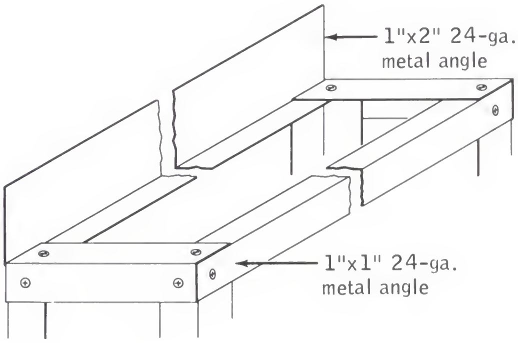

gypsum panel backing screw-applied
1-5/8", 1" or 2-1/4" USG type S screws
caulk when required--see specifications
USG steel J-runner
metal mail chute

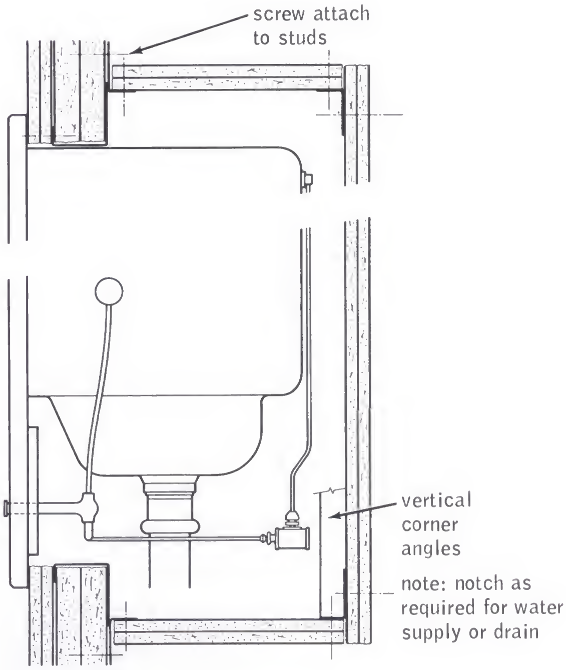
mail chute

Water Fountains and Fire Hose Cabinets

Chase walls are better suited for installation of water fountains and fire hose cabinets than shaft walls which usually require fire ratings. It is generally more economical to erect a separate chase wall, particularly if the run is short, than to provide additional fire protection from within the shaft for these items. Usually the architect accounts for this in his design.

If necessary to install these items in shaft walls, build a frame of angles to encase the item and add appropriate gypsum panel layers as fireproofing to the frame.

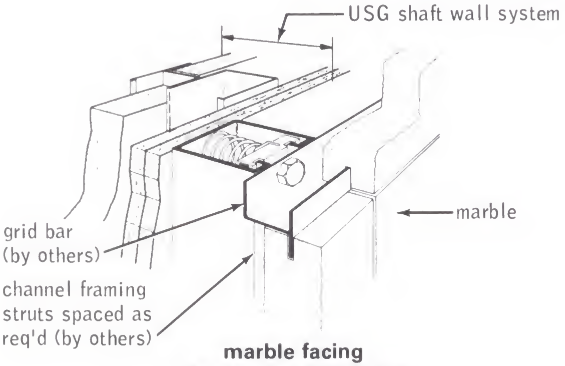




Marble Facing Attachment

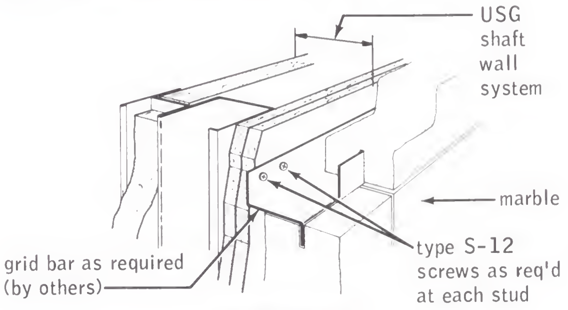
Marble facings can be used in conjunction with the USG Cavity Shaft Wall. Weight of the marble must be supported on the structural floor or on separate structural framing—not on the shaft wall.

There are two methods for attaching face marble to shaft walls in lobbies, corridors, etc. For free-standing attachment, fasten channel framing struts to shaft wall, spacing as required. Position marble facing, fit grid bar into edge slot and bolt to channel framing strut.



marble facing
free-standing attachment

For direct attachment, position marble facing, fit grid bar into edge slot and attach grid bar to C-H Stud with Type S bugle head screws as required.


USG shaft wall system
marble
type S-12 screws as req'd at each stud
grid bar as required (by others)

marble facing
direct attachment

Caulking

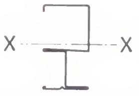
Apply USG Acoustical Sealant around base layer in double-layer gypsum panel applications and around steel framing perimeter in single-layer applications. Apply enough acoustical sealant to prevent air leakage and dirt accumulation.

Elevator shafts go up fast in Standard Oil Co. (Ind.) headquarters building in Chicago.

physical test data

fire rating	description	test no.	stc rating (16-f)	comments
4 hrs. est.	Cavity Shaft Wall Gypsum Drywall—2 layers ⅝" SHEETROCK FIRECODE "C" gypsum panels face side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—1" liner panels & ⅝" gypsum panel core screw att to studs—horiz USG met fur chan 24" o.c.—face side panels screw att to fur chan—panels appl vert with joints stag—joints fin wt 16 width 6¼"			Estimated fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
3 hrs. est.	Cavity Shaft Wall Gypsum Drywall—3 layers ⅝" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels screw att to side opp liner panels with joints stag—base & face layers appl vert—mid layer appl horiz—joints fin wt 12 width 4⅜"		N/A	Estimated fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs. est.	Cavity Shaft Wall Gypsum Drywall—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—RC-1 chan spaced 24" o.c. 1½" THERMAFIBER sound atten blkts—panels & RC-1 chan screw att to side opp liner panels—base layer appl horiz—face layer appl vert—joints fin wt 10 width 4"	BBN-750412 (s)	51	Estimated fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs.	Cavity Shaft Wall Gypsum Drywall—½" SHEETROCK FIRECODE "C" gypsum panels—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin wt 9 width 3½"	U of C 6-23-75 (f)	N/A	Construction fire tested both sides. Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface
2 hrs.	Cavity Shaft Wall Gypsum Drywall—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels appl vert to side opp liner panels & screw att—joints fin wt 9 width 3½"	U of C 3-4-75 (f) U of C 3-5-75 (f) BBN-750706 (s) USG750302 (s)	47 39	Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface. BBN-750706 based on same constr. with 1" blankets in cavity
1 hr.	Cavity Shaft Wall Gypsum Drywall—⅝" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels appl to side opp liner panels & screw att—joints fin wt 8 width 3⅛"	U of C 3-6-75 (f) U of C 3-7-75 (f)	N/A	Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface

design properties — steel components

	stud size	stud designation	wt./lb. per lin. ft.	S_x in.^{3}	I_x in.^{4}	lbs./end reaction
C-H Stud 	2½"	212CH5	.604	.087	.138	205
		212CH8	.862	.185	.327	422
	4"	400CH5	.716	.258	.433	173
		400CH10	1.217	.431	.993	282

limiting heights — 2-hr. cavity shaft walls

stud type & size (1)	stud designation	stud spacing	allowable deflection	air pressure load—psf			
				5	7.5	10	15
2½" C-H Studs	212CH5	24"	1/120	14'0" (f)	11'3" (f)	10'0" (f)	8'0" (f)
			1/240	13'9" (d)	11'3" (f)	10'0" (f)	8'0" (f)
			1/360	12'0" (d)	10'6" (d)	9'6" (d)	8'0" (f)
	212CH8	24"	1/120	18'0" (f)	14'9" (f)	12'9" (f)	10'6" (f)
			1/240	15'0" (d)	13'0" (d)	12'0" (d)	10'6" (d)
			1/360	13'3" (d)	11'6" (d)	10'6" (d)	9'0" (d)
4" C-H Studs	400CH5	24"	1/120	19'3" (f)	15'6" (f)	13'9" (f)	11'3" (f)
			1/240	18'0" (d)	15'9" (d)	13'9" (f)	11'3" (f)
			1/360	15'9" (d)	13'6" (d)	12'6" (d)	11'0" (d)
	400CH10	24"	1/120	25'9" (d)	22'6" (d)	20'0" (f)	16'6" (f)
			1/240	20'6" (d)	17'9" (d)	16'3" (d)	14'3" (d)
			1/360	18'0" (d)	15'6" (d)	14'3" (d)	12'6" (d)

Limiting criteria: f—bending stress, d—deflection. (1) Hot-dipped galvanized steel required for studs. Runner attachment spacing should not exceed 24" o.c.

problems and remedies

1. Expansion and Contraction—Shaft wall surfaces should be isolated with control joints or other means where: **(a)** construction materials change within the plane of the shaft wall; **(b)** shaft wall run exceeds 50 ft. Ceiling-height door frames may be used as control joints, as may less-than-ceiling-height door frames if control joints extend to ceiling from both corners.

2. Concentrated Stresses and Loads—Penetrations of the diaphragm, such as door frames and duct openings, require additional reinforcement at corners to distribute concentrated stresses if a control joint is not used.

Where access panels or large duct penetrations occur in shafts having pressure loads, headers, sills and adjacent channels may require reinforcing to properly distribute these loads.

3. Air Noise—Where shaft walls enclose elevator and return air vents, sealant is recommended at intersections with floors, ceilings, columns, ducts, etc. to seal peripheries and penetrations and minimize whistling and dirt accumulations due to air movement.

4. Deflection—Selection of limiting heights should be based on allowable deflection as follows: **(a)** 1/240 for gypsum panel surfaces, IMPERIAL Plaster surfaces and areas to receive adhesively applied ceramic tile; **(b)** mechanically attached marble or heavy stone should support its own weight from the floor or be separately supported. While some building codes permit design using 1/120 deflection and 5 psf uniform load, this large deflection may cause failure of screws attaching gypsum panels to steel framing components.

5. Attachment Failure—Incorrect choice of type or length of fastener can result in failure of the attachment. USG Type S Screws are suitable for gypsum panel or gypsum base attachment to steel C-H and E-Studs and J-Runners. Type S-12 Screws should be used for all metal-to-metal attachment. Select screw length from table below:

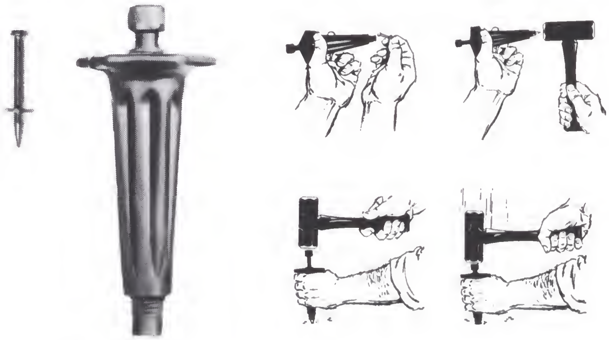
	½″ thick panel	⅝″ thick panel
single layer	1″	1″
double layer		
base layer	1″	1″
face layer	1-5/16″	1⅝″
triple layer		
base layer	1″	1″
mid layer	1-5/16″	1⅝″
face layer	—	2¼″

Screw length should be 2⅜″ for two 1″ laminated liner panels, and at least ⅜″ longer than the total thickness for other applications.

tools

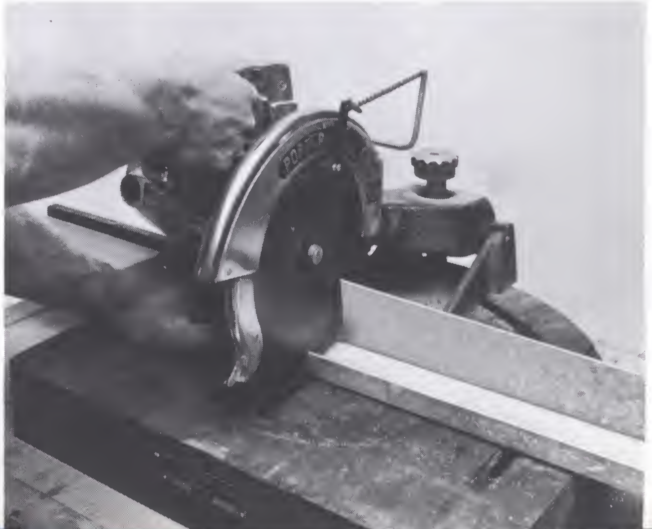
The right tools suitably designed for a particular job can result in improved efficiency, man-hour savings and a high quality of workmanship. Major tools specifically required for USG Shaft Wall installation are described here.

Shure-Set Tool R-375—A hand-operated tool that economically fastens steel J-Runners to concrete or steel with a few hammer strokes. A guide-washer holds fastener in tool then slides up shank as fastener penetrates. This washer provides extra support at penetration point and greater head-bearing area to resist pull-away of runner. Manufactured by Ramset; available at hardware stores.



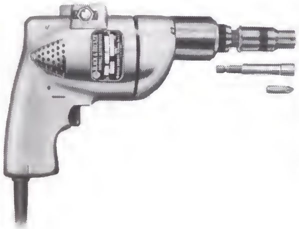
Powder-Actuated Fastening Tool—Speeds the anchoring of steel J-Runners. Drive-in fasteners pierce and pin runner to steel or concrete in one operation. Available at powder-actuated tool suppliers.

Metal-Cutting Saws—Power tools speed cutting steel studs, runners and channels. They are most practical when floors are even and many studs or channels can be cut at one time. Several types are available: metal-cutting band saw, power hacksaw, electric saber saw or cutoff saw with a carborundum blade. Available at hardware stores and power tool suppliers.



Story Pole—Used to measure panel height when floors are relatively even. Fabricate locally from telescoping tubing, conduit or wood strips and adjustable device to secure lengths (pipe or hose clamp).

Power-Driven Screwdrivers—Electric power-driven screwdrivers, used to drive USG Type S and S-12 Screws to attach gypsum panels and metal framing.



NOTE: All products described here may not be available in all geographic markets. Full information about the many products and systems for construction manufactured by United States Gypsum Company is available from your U.S.G. sales office and representatives.

U.S.G. Construction Products Division Offices

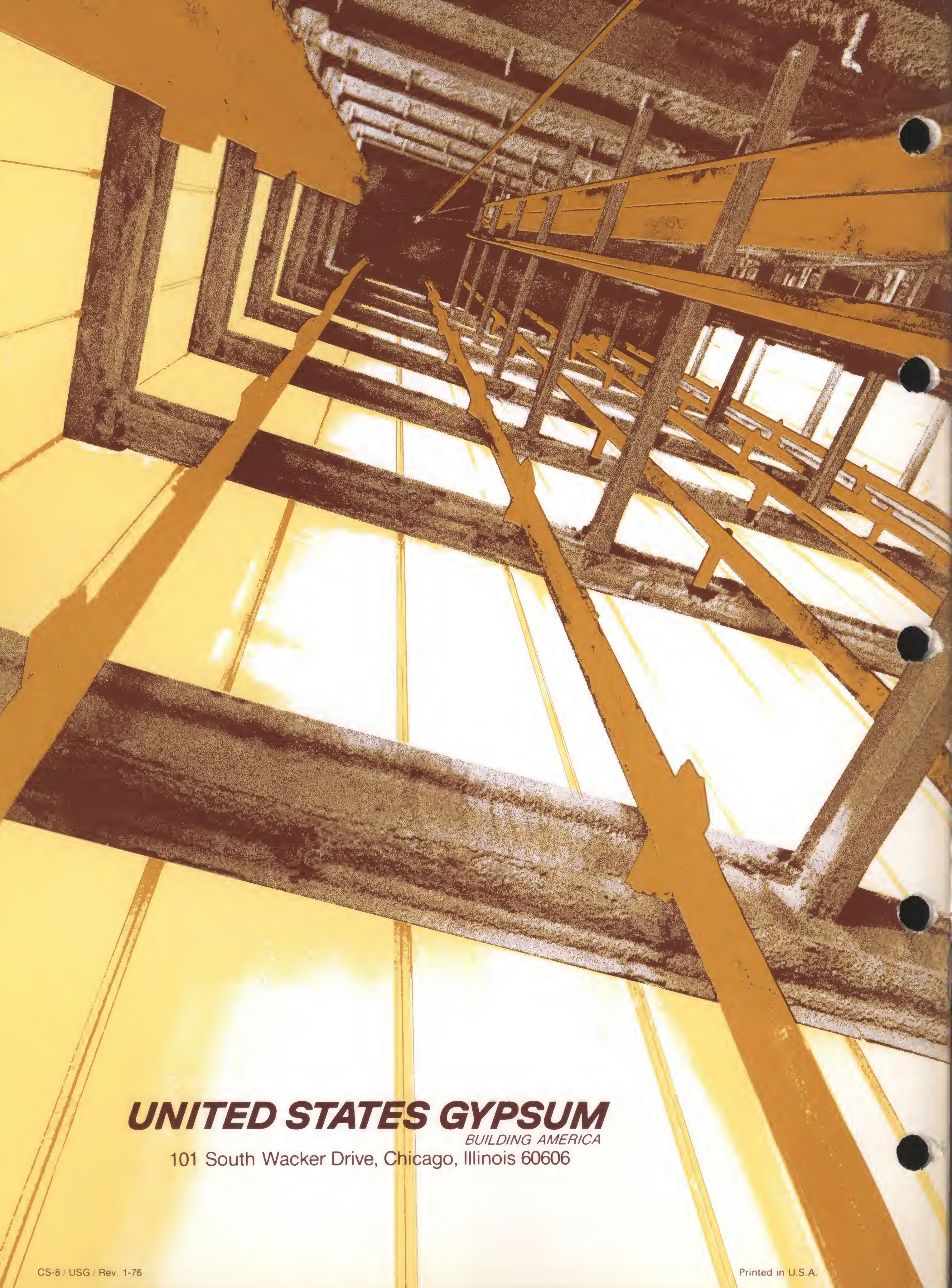
Eastern
555 White Plains Road
Tarrytown, N.Y. 10591
(914) 332-0800

Central
101 South Wacker Drive
Chicago, Ill. 60606
(312) 321-4000

Southern
53 Perimeter Center—East
Atlanta, Ga. 30346
(404) 393-0770

Western
525 South Virgil Ave.
Los Angeles, Cal. 90020
(213) 388-1171

UNITED STATES GYPSUM
1976—1
9 P
GYPSUM DRYWALL
shaft wall



UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

CS-8 / USG / Rev. 1-76

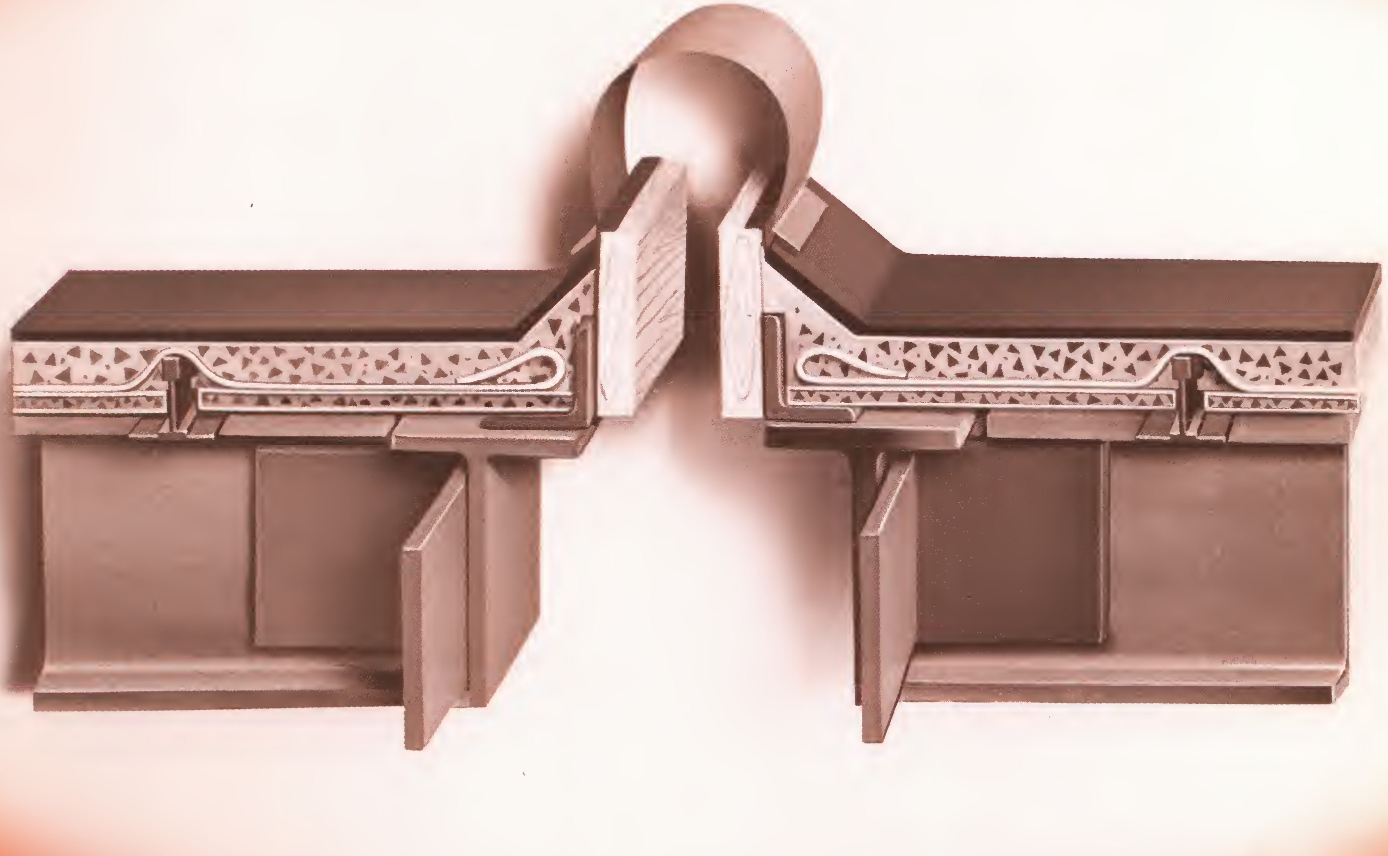
Printed in U.S.A.

MANUFACTURER'S
RECOMMENDATIONS FOR

EXPANSION & CONTRACTION CONTROL JOINTS

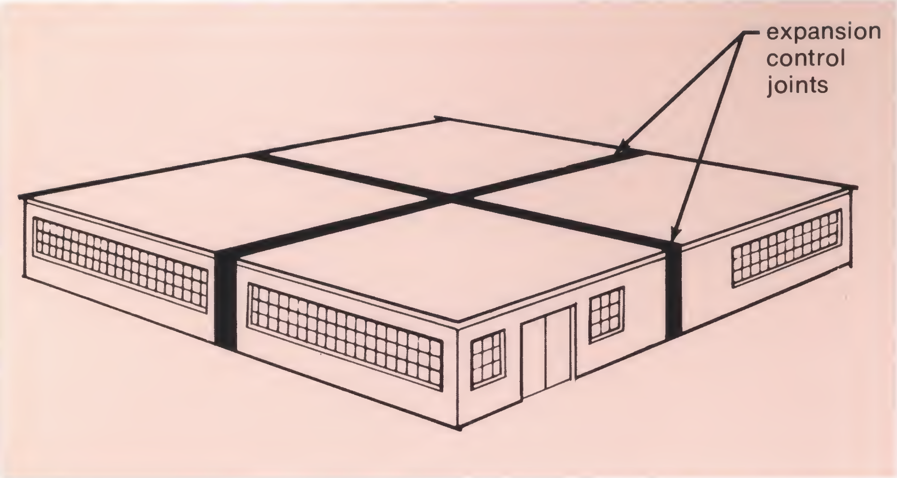
with USG® poured gypsum roof decks & drainage-slope fills

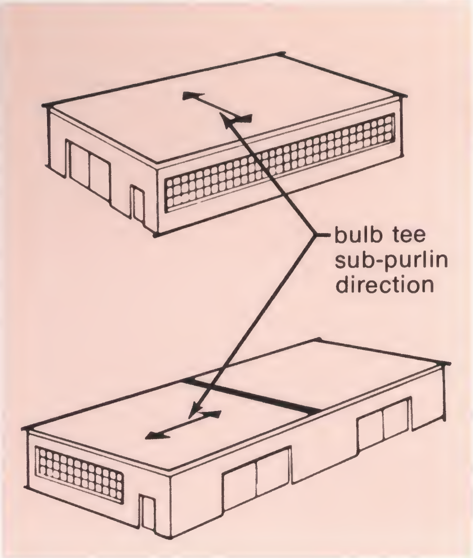
UNITED STATES GYPSUM

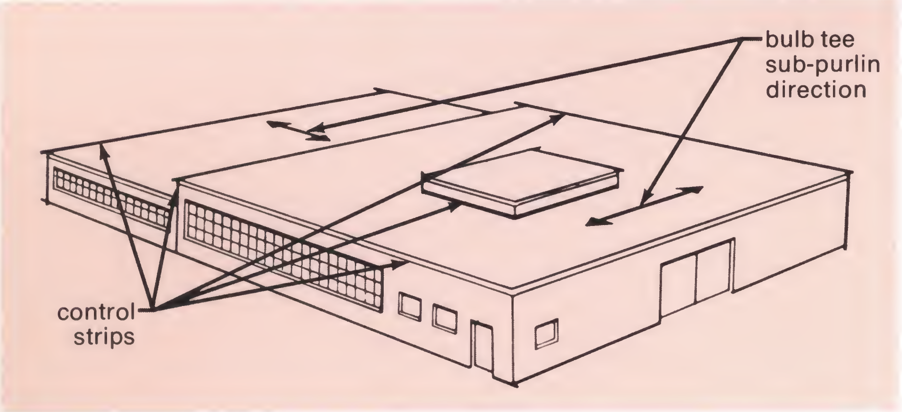


UNITED STATES GYPSUM
1977—12
3 P
CEMENTITIOUS DECKS
poured gypsum deck

GYPSUM FEARS NO FIRE







HOW BUILT-IN CONTROLS REDUCE STRESS—PROVIDE LONG-LASTING PERFORMANCE

Like all other construction materials, gypsum concrete is subjected to stresses from expansion and contraction created by changes in weather. Stresses caused by temperature changes can be minimized by installation of insulation over the top of the roof deck. One type of installation consists of a foamed-plastic roof insulation applied on top of the roofing membrane. Locations of the insulation and waterproofing membrane are reversed, but design basics and methods of construction are about the same as for standard designs.

The coefficient of expansion for poured gypsum is 85×10^{-7} in. per in. per °F. This compares with coefficients of other building materials such as portland cement concrete (79×10^{-7}) and medium steel (65×10^{-7}). Another characteristic of poured gypsum is that it expands slightly as it sets (approximately 0.1%) resulting in firm contact with the sub-purlins. Slab cracks cannot occur from shrinkage as is common during curing of portland cement compositions.

Pyrofill® and Thermofill® Gypsum Concrete Roof Deck Systems and drainage slope fills are designed to control thermal stresses within the slab, preventing a build-up of stresses that could cause cracks severe enough to damage the roof covering.

Sub-purlins welded securely to the structural-steel framing restrict expansion of the slab in a direction perpendicular to the sub-purlins. Contraction of the slab may result in fine hairline cracks over the top of sub-purlins, with no damage to roof coverings.

For standard construction, reinforcing mesh used with gypsum concrete decks is usually butted, not lapped, every 5′-0″ in the direction perpendicular to sub-purlins; therefore, any contraction in this direction may result in fine hairline cracks along the joint lines—again, without damage

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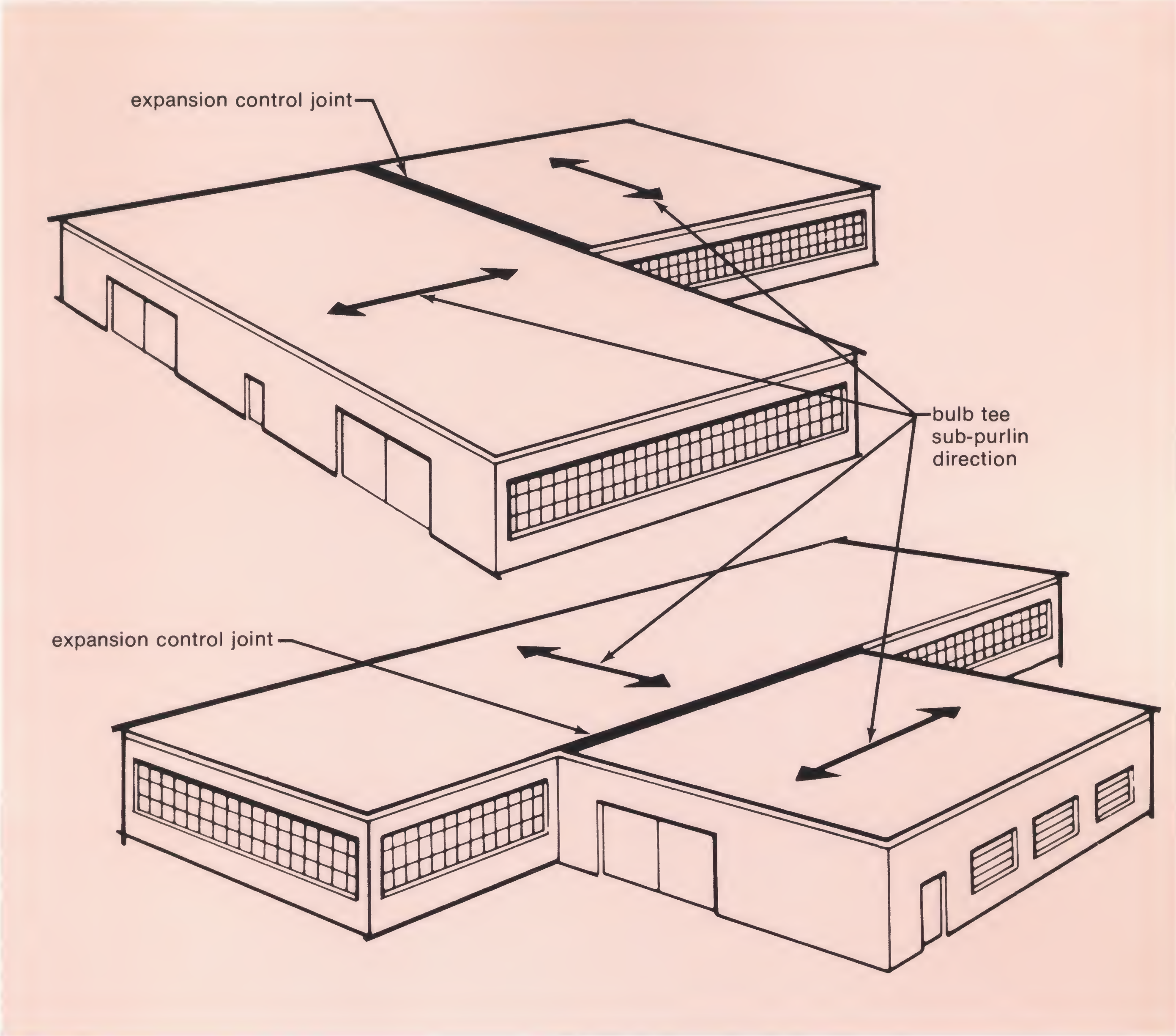


to roof coverings. Butting the mesh does not resist slab expansion parallel to sub-purlins. However, this movement is partially restrained by friction of the slab against the sub-purlins.

For fire-rated and seismic designs, reinforcing mesh is lapped every 5′-0″ in direction perpendicular to sub-purlins.

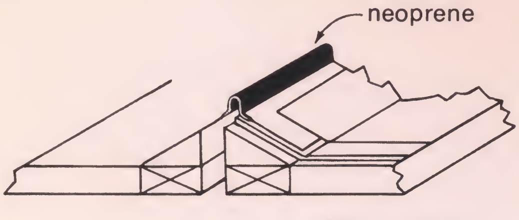
INSTALLATION OF MATERIALS

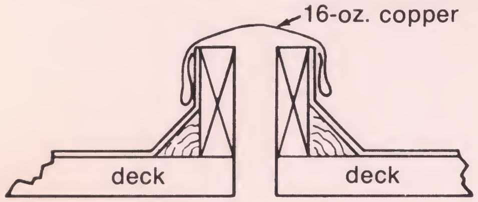
Although the inherent characteristics of gypsum concrete slabs and fills contribute to control of expansion and contraction, the following precautions must be observed:

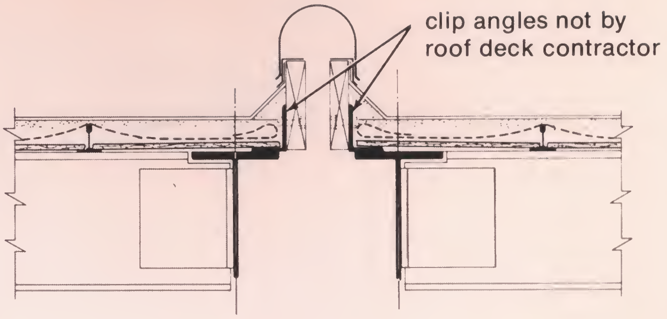
a. Provide expansion control joints in the deck or fill and roofing wherever they are provided in the structure. Frequency of building control joints is dependent upon local design practice (up to max. spacing of 200 ft.).
b. Long, narrow buildings should have expansion control joints through the deck, flooring and supporting structure, spaced not more than 200 ft. apart.
c. Provide mineral fiber expansion control strips at junctures of roof slab or drainage slope fill with parapets, stacks, etc. This is particularly important for gypsum concrete poured in cold weather. Strips may be omitted along walls that are parallel to sub-purlins.
d. Provide expansion control joints through the slab wherever sub-purlins change directions. Also, separate wings of "L", "U" and "T" shaped buildings with expansion control joints.

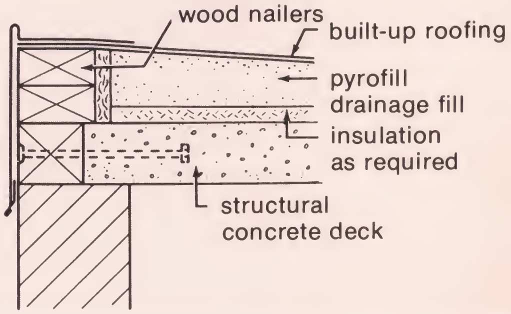
Note: To be effective, expansion control joints must permit relative movement of roof deck and roofing across the joint. (See details of typical control joints on p. 4).

DETAILS FOR TYPICAL EXPANSION CONTROL JOINTS









EXPANSION CONTROL JOINT FOR
GYPSUM CONCRETE DRAINAGE SLOPE FILL

COMPLETION

The structure should be inspected for satisfactory condition with the roof deck contractor's foreman immediately upon completion.

ROOFING APPLICATION RECOMMENDATIONS

For application of built-up roofing, U.S.G. recommends nailing of min. 40-lb. coated base sheet, or equal, for the first ply. This allows slab and/or roofing movement without rupture of the roofing. Follow U.S.G. recommendations in Built-up Roofing Folder IR-154 for type and size nails to be used. Roof covering control and slip joints should be installed in accordance with roofing manufacturer's recommendations.

VENTILATION

Adequate heat and ventilation are necessary for removal of construction moisture emitting from concrete floors, masonry walls and deck. See U.S.G. Drying and Ventilation Folder IR-159 for specific recommendations. Fresh air ventilation should be provided by:

a. Opening doors and windows.
b. Leaving underside of deck open as long as possible, installing soffits and suspended ceilings last.
c. Ventilators "built into" plenum areas.
d. Temporary fans to exhaust moisture-laden air and bring in fresh air where natural ventilation is inadequate.
e. Metal roof vents for gypsum concrete drainage slope fills applied over unvented roof decks (see Drainage Slope Fill Folder IR-518).

Note: Coordinate other trade installations to assure optimum building drying conditions. Specific recommendations may be found in current U.S.G. Architectural Technical Folder SA-305 on Gypsum Concrete Roof Systems in Sweet's General Building File, Sec. 3.4/Un.

FORMBOARD PAINTING

Use only breathing type paints, fortified with a suitable mildew inhibitor as specifically recommended by manufacturer of paint. Related information on painting recommendations may be found in current U.S.G. Architectural Folders SA-933 on USG Paint Products and SA-305; also in Sweet's General Building File, Sec. 9.5/Ue.

a. All exposed roof framing must have an unbroken film of metal primer paint.
b. Apply roof deck paint after the formboard and slab have thoroughly dried.

UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

Printed in U.S.A.

U.S.G. Roof Deck Systems

offer lower life-cycle costs to meet changing needs in energy use, noise control, economy

UNITED STATES GYPSUM

U.S.G. Gypsum Roof Decks

dependable, durable, efficient systems with low life-cycle costs

Gypsum roof deck systems, either poured-in-place or precast, offer more value features than any other major roof deck assembly. Reliable U.S.G. systems provide high-quality roof decks—at competitive costs—ideal for schools, shopping centers, industrial plants and other institutional and commercial buildings.

Many extra features giving superior performance are built into gypsum decks without extra cost. Check the resulting benefits which reduce initial, operating and maintenance costs and produce lower overall life-cycle costs.

Benefits in Initial Costs

Lower HVAC equipment costs result because insulated gypsum decks transmit less heat and require less capacity. Interim financing costs are lower, too.

Sound control, built into gypsum decks, helps meet OSHA Standards, protects workers from exposure to high noise levels.

Fire protection, with ratings up to two hours, gypsum decks meet all major building codes.

Fast, all-weather installation permits earlier occupancy, cuts interim financing costs.

Structural strength to resist wind uplift and seismic shock is provided in gypsum decks without added cost.

Construction costs are a minimum with fast-installing, high-quality gypsum decks that offer superior performance without added cost for extra features.

Benefits in Operating and Maintenance Costs

Energy savings result annually because the roof deck's high thermal insulating properties reduce fuel requirements.

Lower insurance rates, offering significant savings, result when U.S.G. poured gypsum decks are used instead of steel deck.

Illumination costs are reduced with light-reflective ceilings and exposed formboards of gypsum decks.

Maintenance costs are minimal with gypsum decks which resist rot, warping, shrinkage, structural wind damage, attack by insects and employ prefinished formboards and ceiling materials. Sudden temperature changes that may damage roofing have less effect when roofing is directly applied to gypsum decks than to insulation over steel decks, making roofing maintenance easier.

The following pages document the facts, graphically summarized in the table below, that U.S.G. roof decks offer lower life-cycle costs than steel or lightweight concrete decks.

here's proof U.S.G. roof decks offer more

	steel	mineralized wood fiber	lightweight concrete	PYROFILL poured gypsum
UL-rated assembly	Design P409 2-hour rating	Design P403 2-hour rating	Design P215 2-hour rating	Design P207 2-hour rating(1)
approx. cost/ deck & ceiling only	$2.10 per sq. ft.	$2.10 per sq. ft.	$1.70 per sq. ft.	$1.45(2) $1.65(3) per sq. ft.
acoustical properties	minimal (plaster)	minimal (plaster)	NRC .60 to .70	NRC .60 to .70
light reflectance	determined by finish applied	determined by painting	85%—LR-1	85%—LR-1
year-round construction	yes	yes	only above 40°F.	yes
ceiling	brown coat plaster	finished plaster	½-in. gypsum board over 5/8-in. ceramic acoustical tile	⅝" AURATONE FIRECODE acoustical ceiling panels(4)
lateral restraint lb./lin. ft.	300	400	670	1060 KEYDECK mesh, 840 1214 mesh
wind uplift UL Class 90	no	yes	no	yes
insulation U-factor deck & ceiling	.21	.21	.13	.18(2), .11(3)
ceiling flexibility accessibility	none unless access panels installed	none unless access panels installed	fully accessible	fully accessible

(1) Possible extended-coverage insurance advantage. (2) With SHEETROCK Formboard. (3) With 1" FIRECODE Formboard. (4) Five different patterns.

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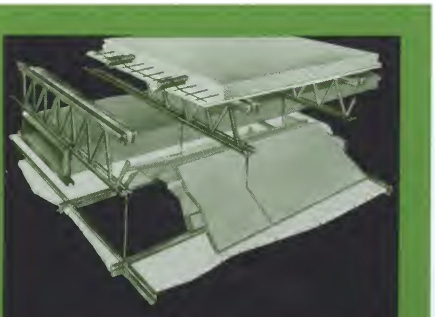
Choice of Systems

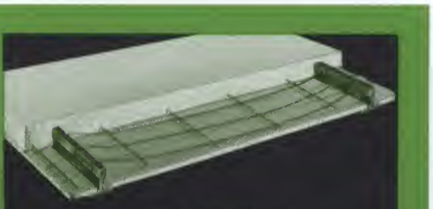
specialized types of gypsum decks meet specific needs

Fire-rated Gypsum Roof Decks of PYROFILL and THERMOFILL Gypsum Concrete are poured in place over galvanized reinforcing mesh and formboards supported by steel subpurlins. Formboards are left exposed or a rated finished ceiling is suspended below. The result is a rockhard, monolithic roof deck system that resists hurricane uplift wind forces up to 125 psf; has passed the difficult UL Wind Uplift Class 90 test; resists seismic shock well in excess of current building code requirements. Poured gypsum concrete takes any roof shape needed—flat, curved or pitched—to match function to form. Gypsum sets fast, so roofing can be applied without undue delay. These features make the systems ideal for schools, hospitals and other buildings where up to 2-hour fire resistance is required.

THERMOFILL has all the advantages of PYROFILL plus perlite aggregate that gives poured decks better thermal insulation with less weight.

Non-rated Gypsum Roof Decks are poured systems that offer most of the features of rated decks. They meet normal live and dead load requirements for roof purlin spacings up to 11 ft. where roof framing is steel, concrete or wood, with prestressed concrete structural elements spaced up to 16 ft., clear spans up to 100 ft. may be obtained.


fire-rated deck


non-rated deck

Drainage Slope Fills of quick-setting gypsum concrete are poured in place over structural roof decks of poured or precast concrete or wood. They provide smooth, monolithic, sloped surfaces that are easily roofed. Notably low in cost, these lightweight fills offer rapid installation even in cold and freezing weather. Also ideal for use over old roof decks to provide slope to drains.

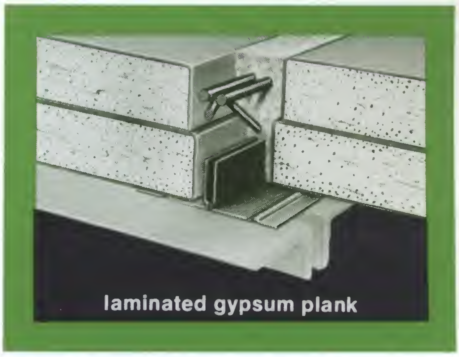
USG Metal Edge Gypsum Plank, with a specially developed water-resistant core, is precast at the factory for installation in any weather on flat or steeply pitched roofs. Planks are quickly laid over steel, concrete or wood joists to form a noncombustible, structurally reinforced roof deck ready for roofing. The assemblies have qualified for 2-hour UL fire ratings with either an acoustical panel or gypsum panel ceiling.

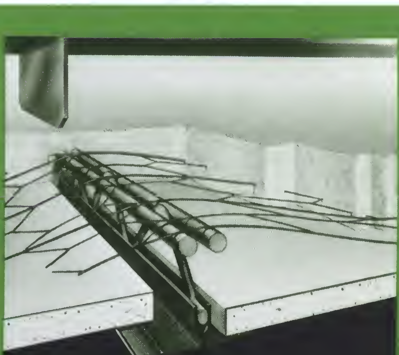
SPAN-ROCK Gypsum Roof Planks offer simple-to-install, low-cost, dry deck systems ideal for use over conventional bar joists or purlins on smaller projects. These units combine with steel framing to reduce deck weight up to 50% less than other dry systems. They provide efficient, 1-1/2-hour rated assemblies that meet most live load requirements on spans up to 8 ft. The factory-laminated gypsum board planks, 2 in. thick, nom. 2 ft. wide, and 8 or 10 ft. long, weigh 8.4 psf and are supported by regular roof deck sub-purlins.

drainage slope fill

precast gypsum plank

USG Service Ceilings are lightweight, noncombustible ceiling mezzanines suspended from the floor structure above to create an interstitial space for utilities and mechanical equipment. They weigh about 50% less than precast concrete decks, offer 2-hr. fire resistance, provide unrestricted freedom in locating partitions below and ready access to utilities in the space. Several systems constructed of poured-in-place gypsum concrete or laminated gypsum plank are available. Refer to U.S.G. Data Sheets IR-581, IR-582, IR-583, IR-584, and Folder IR-555 for technical information, details and specifications.


laminated gypsum plank


service ceiling

Energy Conservation

superior thermal performance cuts fuel costs, reduces HVAC capacity needed

Escalating fuel costs accompanied by possible fuel shortages have forced greater use of energy-conserving systems in construction. In U.S.G. poured gypsum roof decks, superior thermal performance is one of the major advantages. These decks effectively curb energy waste in heated and air-conditioned buildings, reducing annual operating costs. Their low "U" values reduce HVAC capacity requirements, equipment and annual interest costs.

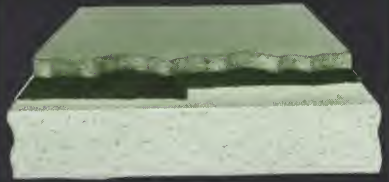
Needed thermal insulation can often be obtained in a poured gypsum deck without added insulation. For instance, a standard 3-in. roof deck of PYROFILL Gypsum Concrete over 1-in. FIRECODE Formboard provides better thermal insulation than a steel deck with 1-1/2-in. rigid insulation. In addition, gypsum concrete has greater capacity for storing heat than steel deck or insulation. This property reduces the thermal shock for roof coverings with possible damage which occurs during sudden changes in temperature.

Based on a typical 100,000-sq. ft. plant in the Chicago area, proper thermal design can produce over $51,000 *initial* savings in heating and cooling equipment plus $3,744 *annual* savings in reduced fuel cost (natural gas) and $3,222 *annual* savings in cooling energy compared to insulated steel deck. Details of this example and complete data to help specifiers determine their energy savings for specific buildings are available in U.S.G. Energy Conservation Folder IR-571.

thermal design data

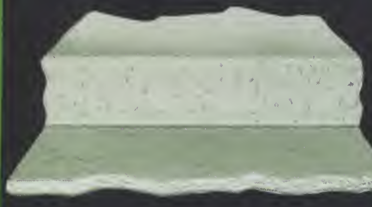
Thermal insulation may be provided in the roof/ceiling assembly in four ways (see details). The tables below show design insulation values for various U.S.G. roof deck and ceiling combinations as well as roof deck systems with exposed formboards.

over the deck



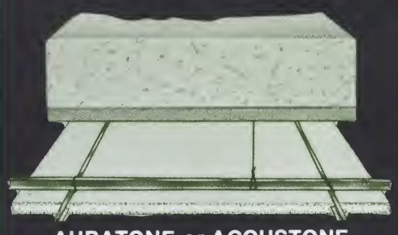
roofing membrane, USG roof insulation

in the formboard



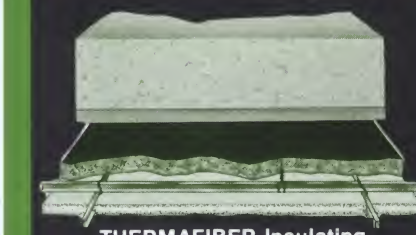
Economy FIRECODE Formboard (see table right, for other types)

in the ceiling



AURATONE or ACOUSTONE Ceiling Tile or Panels

above the ceiling



THERMAFIBER Insulating Blankets

thermal insulation—"U" values (1)
(for 2″ gypsum concrete over FIRECODE Formboard)

deck system		no insulation		1″ insulation		no insulation—⅝″ AURATONE Panels or Tile Ceiling(2)	
type of fill	formboard thickness(3)	winter	summer	winter	summer	winter	summer
2″ PYROFILL Gypsum Concrete	¾″	.19	.18	.12	.12	.13	.12
	1″	.16	.15	.11	.11	.11	.11
	1½″	.13	.12	.09	.09	.09	.09
	1¾″	.11	.11	.09	.08	.09	.08
	2″	.10	.10	.08	.08	.08	.08
2″ THERMOFILL Gypsum Concrete	¾″	.18	.17	.12	.11	.12	.11
	1″	.15	.14	.11	.10	.11	.10
	1½″	.12	.11	.09	.09	.09	.09
	1¾″	.11	.10	.08	.08	.08	.08
	2″	.10	.09	.08	.07	.08	.07

(1) Cross tees required for other than purlin lengths. (2) Suspended ceiling and vented space. (3) Sub-purlins should extend min. of ¼″ above the top surface of formboard.

design weight and insulation—"U" values (1)
(for fire-rated and non-rated decks)

deck system	dry deck weight psf(3)	wood, mineral or perlite roof insul. thickn-in.	"U" values—exposed formboard	"U" values—⅝" AURATONE Panels or Tile(4)		
				no added insul.	plus 2" insul. blankets	plus 3" insul. blankets
2" PYROFILL Gypsum Concrete ½" SHEETROCK Formboard	11	0	.34	.18	.08	.06
		½	.23	.14	.07	.06
		1	.18	.12	.06	.05
		1½	.14	.10	.06	.05
2" PYROFILL Gypsum Concrete 1" FIRECODE Formboard	10	0	.16	.11	.06	.05
		½	.13	.10	.06	.05
		1	.11	.09	.05	.04
		1½	.10	.08	.05	.04
2¼" PYROFILL Gypsum Concrete ¼" Asbestos-Cement Formboard	12	0	.37	—	—	—
		½	.25	—	—	—
		1	.18	—	—	—
		1½	.15	—	—	—
2" THERMOFILL Gypsum Concrete ½" SHEETROCK Formboard	8	0	.30	.17	.07	.06
		½	.21	.13	.07	.05
		1	.16	.11	.06	.05
		1½	.13	.10	.06	.05
2" THERMOFILL Gypsum Concrete 1" FIRECODE Formboard	8	0	.15	.11	.06	.05
		½	.13	.09	.06	.05
		1	.11	.08	.05	.04
		1½	.09	.07	.05	.04
2" THERMOFILL Gypsum Concrete 1½" FIRECODE Formboard	8	0	.12	.09	.05	.04
		½	.10	.08	.05	.04
		1	.09	.07	.05	.04
		1½	.08	.07	.04	.04

deck system	dry deck weight psf(3)	wood, mineral or perlite roof insul. thickn-in.	"U" values—¾" ACOUSTONE Tile or Panels(5)			"U" values—⅝" SHEETROCK Gypsum Panels(6)			
			"F" Fiss.	Foil-Back (1)	Foil-Back (2)	Regular	Foil-Back (1)	Foil-Back (2)	plus Acoustical Tile(6)
2" PYROFILL Gypsum Concrete ½" SHEETROCK Formboard	11	0	.17	.13	.07	.23	.16	.07	.16
		½	.14	.11	.06	.18	.13	.07	.13
		1	.12	.09	.06	.14	.11	.06	.11
		1½	.10	.08	.05	.12	.09	.06	.09
2" PYROFILL Gypsum Concrete 1" FIRECODE Formboard	10	0	.11	.09	.05	.13	.10	.06	.10
		½	.10	.08	.05	.11	.09	.06	.09
		1	.09	.07	.05	.10	.08	.05	.08
		1½	.08	.07	.04	.09	.07	.05	.07
2" THERMOFILL Gypsum Concrete ½" SHEETROCK Formboard	8	0	.16	.12	.06	.21	.15	.07	.15
		½	.13	.10	.06	.16	.12	.07	.12
		1	.11	.09	.05	.13	.10	.06	.10
		1½	.10	.08	.05	.11	.09	.06	.09
2" THERMOFILL Gypsum Concrete 1" FIRECODE Formboard	8	0	.10	.09	.05	.13	.10	.06	.10
		½	.09	.08	.05	.11	.09	.05	.09
		1	.08	.07	.05	.09	.08	.05	.08
		1½	.07	.06	.04	.08	.07	.05	.07
2" THERMOFILL Gypsum Concrete 1½" FIRECODE Formboard	8	0	.09	.08	.05	.10	.08	.05	.08
		½	.08	.07	.05	.09	.08	.05	.07
		1	.07	.07	.04	.08	.07	.05	.07
		1½	.06	.06	.04	.07	.06	.04	.06

(1) Btu/sq. ft./hr./deg. F temp. diff. (includes built-up roofing); for winter conditions—heat flow up, except as noted; (2) summer conditions—heat flow down. (3) Weight of sub-purlin or roofing not included. PYROFILL density: 50 lb. per cu. ft., THERMOFILL concrete density: 39 lb. per cu. ft. (4) Mechanically suspended. (5) Furred suspended. (6) With ¾" ACOUSTONE "F" Tile adhesively applied.

Noise Control

built-in acoustical performance helps meet OSHA Standards, provides a quiet, comfortable environment

U.S.G. Gypsum Roof Decks offer the most economical method of incorporating large sound-absorbent surfaces in new construction. With either exposed formboards or separately suspended acoustical ceilings, these decks provide highly efficient sound control materials to absorb sound, reduce reverberation and sound levels within the building, and attenuate exterior noise. A wide choice of acoustical materials and construction is available to meet requirements for industrial, institutional and commercial buildings.

industrial noise control

The Occupational Safety and Health Act of 1970 is part of a national effort to protect workmen from conditions that might be dangerous to their health and safety. It limits the exposure to high noise levels—known to produce permanent loss of hearing—and affects all manufacturing facilities engaged in interstate commerce. In new plant design, consideration must be given to control noise levels within specified ranges. The alternative, limiting the employee's daily exposure to high noise levels, has the effect of increasing production costs.

AURATONE Acoustical Panels in home economics classroom of Beverly Hills, Calif. High School supply high sound absorption and attenuation values desired by architect.

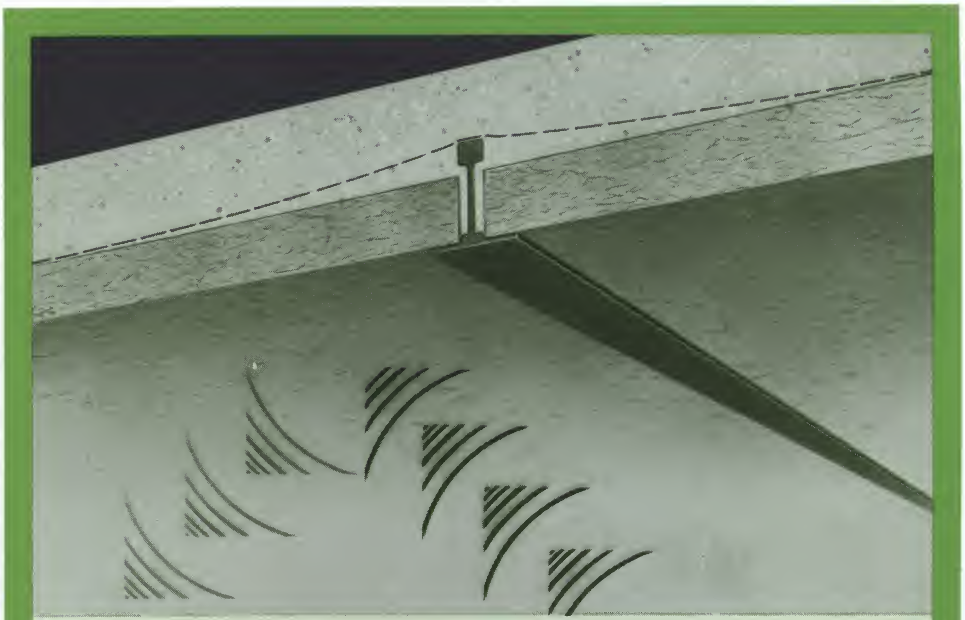
Gypsum decks effectively control outside noise and absorb machine noise. Highly reflective U.S.G. form-

boards lower illumination and maintenance costs, improve ceiling appearance.

U.S.G. Roof Deck Systems with gypsum concrete poured over exposed glass-fiber formboards offer the best means to provide a low-cost, highly efficient acoustically treated interior surface. These formboards effectively absorb sound and reduce reverberation. Inside noise levels can be reduced up to 7 db with these formboards which offer .75 to .95 NRC depending on the thickness used. Detailed data and specifications are available in U.S.G. Noise Control Folder IR-548.

exterior noise control

Exterior noise is efficiently attenuated by the high sound transmission loss of the gypsum deck. PYROFILL Gypsum Concrete, poured 2-1/2 in. thick over SHEETROCK Formboard, developed STC 46 as tested by Riverbank Acoustical Laboratories. The test, conducted on a deck with exposed tees and no acoustical ceiling, resulted in sound attenuation three points higher than the best-rated steel deck system.



PYROFILL or THERMOFILL Gypsum Concrete is poured-in-place over galvanized reinforcing mesh and glass-fiber formboards supported by steel sub-purlins. Exposed formboards provide a highly acoustical interior surface.

Fire Protection

a choice of 2-hour fire-rated systems with • poured or precast gypsum concrete • exposed formboard or suspended acoustical ceilings

The UL-tested U.S.G. roof deck systems listed below assure the extra protection required in a specific application without special roof construction or extra roof deck protection. U.S.G.'s policy of comprehensive testing of complete roof systems assures high-quality decks that meet all major building codes and qualify for lower insurance rates than insulated steel decks.

UL Design No. P676
(2-Hr. RA, UA, UB)(1)
2-in. PYROFILL Poured Gypsum Concrete and KEYDECK reinforcing mesh on 1/2-in. exposed SHEETROCK or 1-in. FIRECODE Formboard supported by KEYDECK truss tees spaced 32-3/4 in. o.c. on fireproofed beams 8 ft. o.c. max.

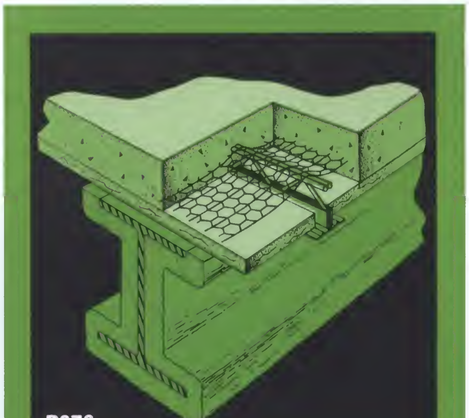
UL Design No. P677
(2-Hr. RA, UA, UB)(1)
2-in. THERMOFILL Poured Gypsum Concrete and KEYDECK reinforcing mesh on 1- to 1-1/2-in. exposed FIRECODE Formboard supported by KEYDECK truss tees spaced 32-3/4 in. o.c. on fireproofed beams spaced 7 ft. o.c. max.

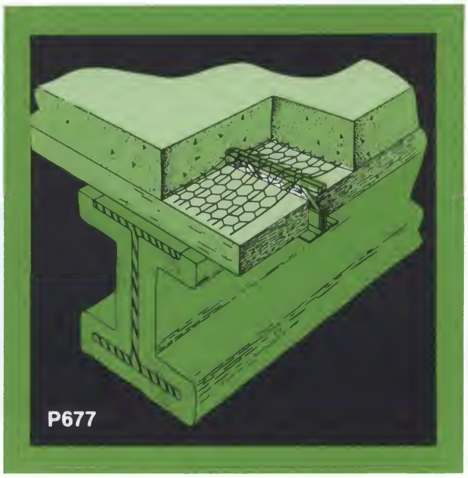
UL Design No. P207
(2-Hr. RA, 1½-Hr. UA)(1)
2-in. PYROFILL Poured Gypsum Concrete reinforced with KEYDECK wire mesh on 1/2-in. SHEETROCK or 1-in. FIRECODE Formboard supported by sub-purlins spaced 32 in. o.c. and welded to 12-in. steel bar joists 4 ft. o.c. max. and AURATONE FIRECODE or AIRSON AURATONE FIRECODE Acoustical Panels suspended on an exposed rated grid system.

UL Design No. P002
(2-Hr. RA, 1½-Hr. UA)(1)
2-in. THERMOFILL Poured Gypsum Concrete and KEYDECK reinforcing mesh on 1/2-in. SHEETROCK or 1-in. FIRECODE Formboard supported by sub-purlins spaced 32-5/8 in. o.c. and welded to 10-in. steel bar joists spaced 4 ft. o.c. max. and AURATONE FIRECODE or AIRSON AURATONE FIRECODE Acoustical Tile suspended on a concealed Z-runner system.

UL Design No. P503
(2-Hr. RA, 1½-Hr. UA)(1)
2-in. PYROFILL Poured Gypsum Concrete and KEYDECK reinforcing mesh on 1/2-in. SHEETROCK Formboard supported by KEYDECK truss tees spaced 32-3/4 in. o.c. and welded to 14-in. steel bar joists spaced 4 ft. o.c. max.; USG Metal Furring Channels spaced 24 in. o.c. wire-tied to joists, 5/8-in. SHEETROCK FIRECODE "C"

WALT WHITMAN HIGH SCHOOL, Montgomery, Md.


P676


P677

Gypsum Panels screw-attached to channels, joints unfinished or taped.

UL Design No. P229
(1½-Hr. RA, 1-Hr. UA)(1)
2-in. PYROFILL Poured Gypsum Concrete and KEYDECK reinforcing mesh on 1/2-in. SHEETROCK Formboard supported by KEYDECK truss tees spaced 32-5/8 in. o.c. and welded to 10-in. steel bar joists 6 ft. o.c. max.; IRMA roof assembly—built-up roofing on slab, 4-in. rigid foam plastic insulation above roofing with crushed stone over insulation; light fixtures and air dampers, 5/8-in. AURATONE FIRECODE Ceiling Panels on a suspended exposed rated grid system.

UL Design No. P213
(2-Hr. RA, UA)(1)
USG Metal Edge Gypsum Plank clipped or welded to 14-in. bar joists spaced up to 7 ft. o.c., 3/4-in. noncombustible roof insulation, light fixtures and air dampers, AURATONE FIRECODE Ceiling Panels on an exposed rated grid system.

UL Design No. P501
(2-Hr. RA, UA)(1)
USG Metal Edge Gypsum Plank clipped or welded to 14-in. bar joists spaced up to 4 ft. o.c., 3/4-in. noncombustible roof insulation, USG Metal Furring Channels spaced 24 in. o.c. wire-tied to joists, 5/8-in. SHEETROCK FIRECODE "C" Gypsum Panels screw-attached to channels, joints unfinished or taped.

UL Design No. P228
(1½-Hr. RA, UA)(1)
SPAN-ROCK Gypsum Planks grouted in place on KEYDECK truss tees spaced nom. 24 in. o.c., tees welded to 12-in. bar joists spaced 7 ft. o.c., 3-1/2-in. noncombustible roof insulation and AURATONE FIRECODE Ceiling Panels on an exposed rated grid system.

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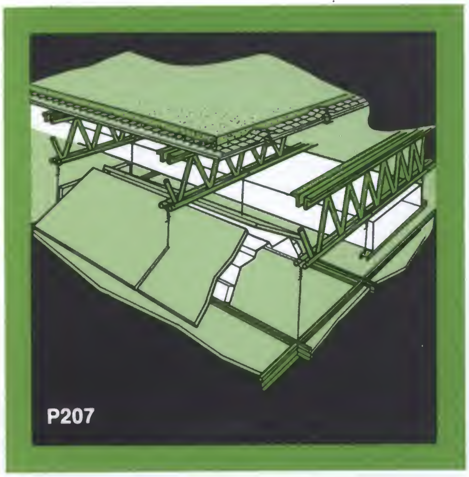
(1) RA—Restrained Assembly, UA—Unrestrained Assembly, UB—Unrestrained Beam.

continued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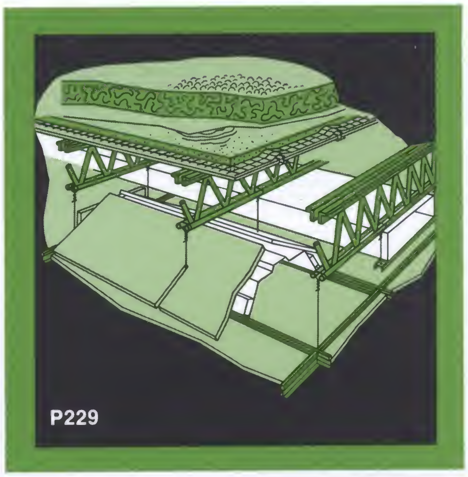
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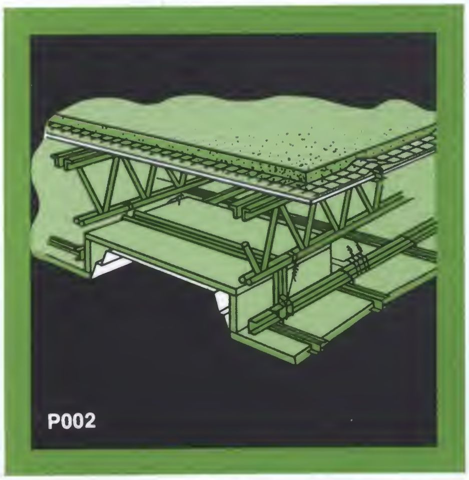
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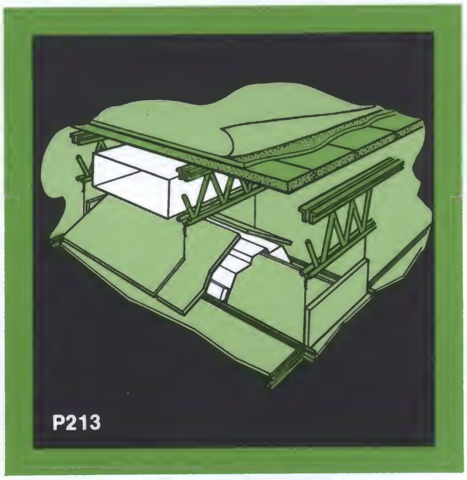
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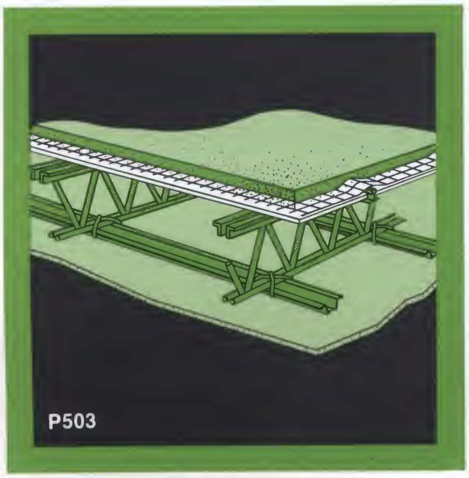
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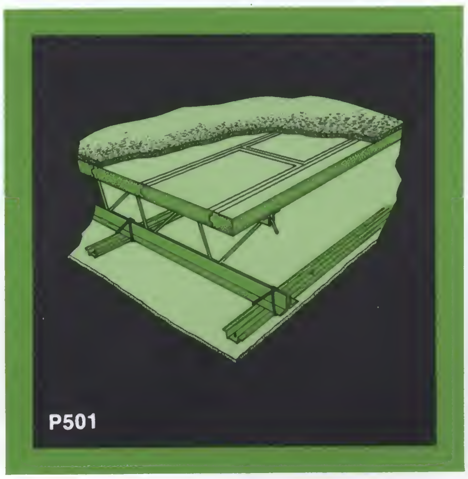
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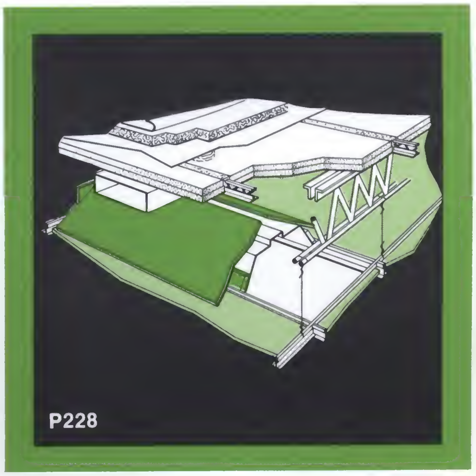

P228

rate study proves insurance savings

Building owners can save up to 55% annually on Property Damage and Business Interruption Insurance when U.S.G. poured gypsum deck systems are used instead of steel deck assemblies, according to a recent study by the National Loss Control Service Corp. This firm developed rate comparisons for gypsum and steel roof decks in five areas of the U.S.A. for shopping centers, manufacturing plants and warehouses both with and without automatic sprinkler protection. The comparison below shows almost $7,000 annual savings for a typical sprinklered industrial plant near Chicago and over $22,000 annual savings for the same unsprinklered building.

Specifiers of this large enclosed shopping center used a noncombustible, economical U.S.G. roof deck to cut spiraling costs.

Ask your U.S.G. sales engineer to show you the complete NLCSC study and to detail savings possible on a similar building in your area.

Savings on Typical Manufacturing Plant in Suburban Chicago for a U.S.G. Poured Gypsum Roof Deck vs. an Insulated Steel Deck

Ordinary Hazard Insurance—300,000 Sq. Ft. Floor Area (sprinklered)

Value	80% Co-Insurance	2-hour Gypsum Roof Deck Rate per $100	Steel Roof Deck Rate per $100	Difference per $100	Annual Premium Savings
Building $3,000,000	80%	$0.08	$0.177	$0.097	$2,328
Contents $4,000,000	80%	0.08	0.177	0.097	$3,104
		Total Fire Insurance Premium Savings			$5,432

Business Interruption Insurance (normally about 80% of building fire insurance rate)

Assume $2,000,000 Annual Value $2,000,000 x 0.80 x 0.097/$100	$1,552
Total Annual Insurance Premium Savings	**$6,984**

Ordinary Hazard Insurance—300,000 Sq. Ft. Floor Area (non-sprinklered)

Value	80% Co-Insurance	2-hour Gypsum Roof Deck Rate per $100	Steel Roof Deck Rate per $100	Difference per $100	Annual Premium Savings
Building $3,000,000	80%	$1.999	$2.312	$0.313	$ 7,512
Contents $4,000,000	80%	2.384	2.698	0.314	$10,048
		Total Fire Insurance Premium Savings			$17,560

Business Interruption Insurance (normally about 80% of building fire insurance rate)

Assume $2,000,000 Annual Value $2,000,000 x 0.80 x .313/$100	$ 5,008
Total Annual Insurance Premium Savings	**$22,568**

Fast Installation

pour up to 30,000 sq. ft. per day, apply roofing without delay

NORTHLAKE MALL, Atlanta, Ga. occupies over 80 acres, has more than 100 tenants. Architects specified a U.S.G. gypsum roof deck because it could be installed quickly to meet tight schedules.

Acre-sized gypsum roof decks can be poured in a short time with a single crew. The quick-setting action of gypsum concrete permits roofing almost immediately and also makes it one of the best roof deck materials for winter construction. There's no wait for curing as with ordinary lightweight concrete decks; no costly delays in erection schedules.

U.S.G. roof decks can be poured in cold weather; in any weather in which men can work. The exothermic reaction in the slab protects it from freezing until the gypsum has set and the slab can carry design loads.

Cut Construction Costs

economical design combines value with installation savings

in fire-rated systems...

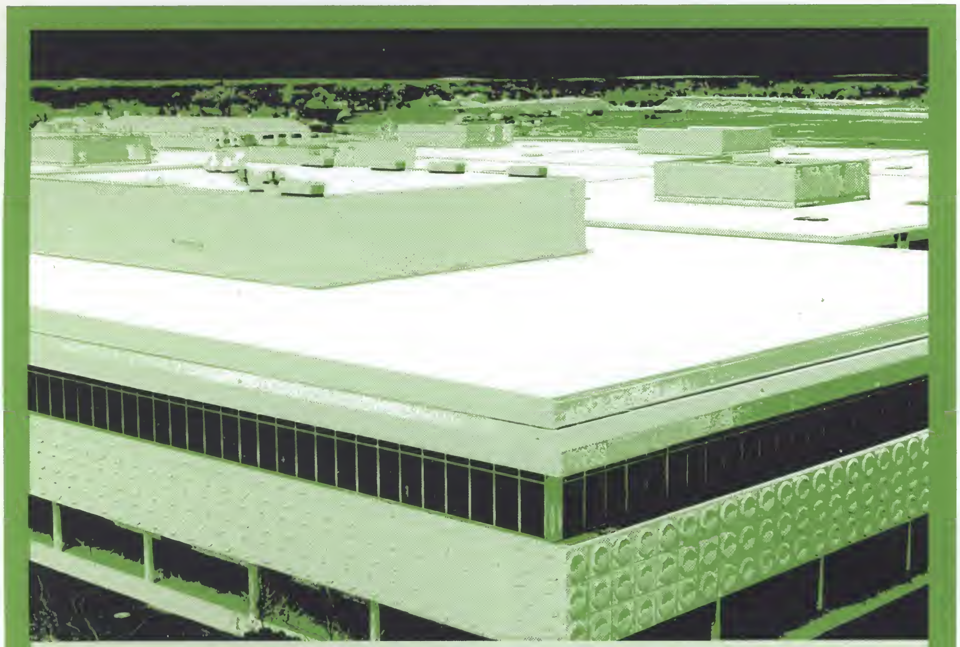
Initial savings can amount to thousands of dollars in construction investment when U.S.G. fire-rated roof decks are specified. A UL 2-hour fire-rated system often costs only 5 cents per sq. ft. more than a non-rated system...up to 65 cents per sq. ft. *less* than other types of UL fire-rated decks. U.S.G. decks enjoy ready acceptance from major code bodies and insurance companies.

in non-rated systems...

Savings are achieved through the unique advantages U.S.G. roof decks offer in strength, fire protection and durability. Savings also occur through low "U" values which reduce costs of air-conditioning and electrical heating; and through highly light-reflective U.S.G. formboards which can lower illumination costs. Both these features offer positive measures to conserve energy and keep operating costs from spiraling.

in drainage slope fill systems...

Important savings in steel framing costs are available with this simplified system which is sold erected-in-place at remarkably low unit cost. The system also offers possible economies through ease of application, cold-weather installation and earlier occupancy.



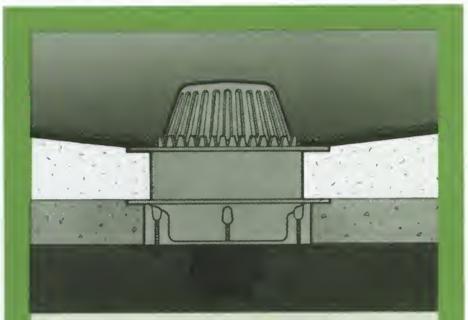
CULLIGAN INTERNATIONAL COMPANY, Northbrook, Ill.

Factory Mutual approved

U.S.G. gypsum roof decks meet Factory Mutual noncombustible Classification to qualify for lowest extended-coverage insurance rates without the clear-span limitations imposed upon steel roof deck designs as covered in Factory Mutual Specification 1-28 for Class I construction.

There are no restrictions on bar joist spacing with the Factory Mutual poured gypsum noncombustible roof deck specification. Bar joist spacing can be optimized for major cost reductions over steel and lightweight concrete deck systems.

Steel decks also require side lap attachment, thicker roof insulation, special adhesive attachment and 4-ft. wide perimeter nailing that further increase job cost.



Smooth, monolithic, sloped surfaces are ready for almost immediate roofing.

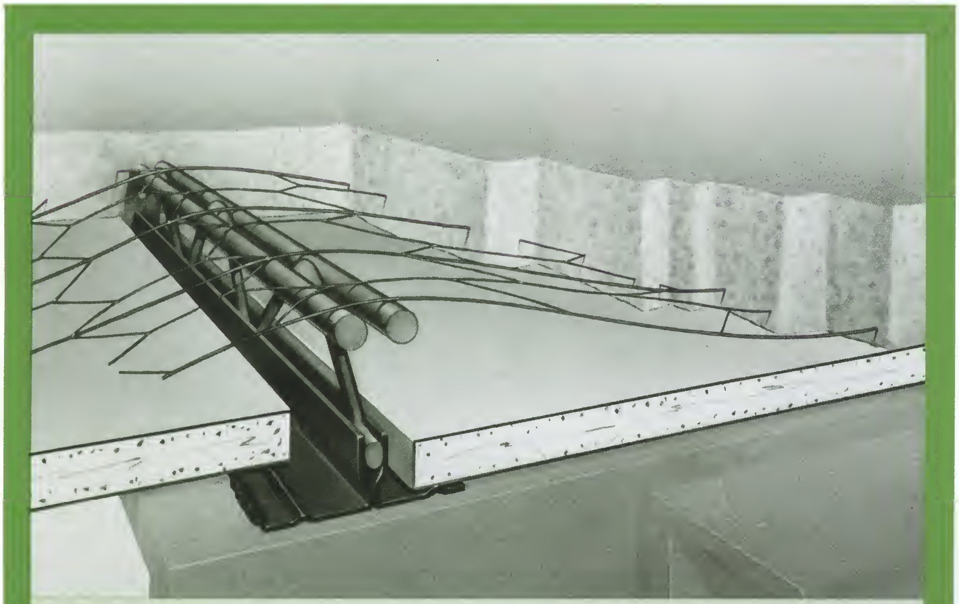
Structural Strength

exceptional integrated resistance to uplift, shear and roof loads, proven in hurricanes and earthquakes

U.S.G. roof deck systems form a monolithic unit that structurally integrates the roof deck with the roof framing. Sub-purlins, securely welded to bar joists or purlins, resist uplift and transmit slab loads. Reinforcing mesh absorbs tensile stress, enables the slab to transmit the load to the framing. With truss tees, the gypsum fill flows through the open web to mechanically key all components into a structural unit. The resulting rigid diaphragm firmly resists horizontal loading from wind and seismic forces.

Gypsum concrete decks have high structural strength and a hard surface. In tests, standard assemblies supported uniform roof loads over 450 psf when wet and 700 psf when dry. At dry densities of 48 to 50 pcf for PYROFILL and 38 to 40 pcf for THERMOFILL, the minimum compressive strength of the slab is 500 psi. This conforms to ANSI A59.1-1968 (R1972) and ASTM C317-64 (1970) Standards for Class A gypsum concrete; exceeds the strength of other insulating fills; provides a better base for roofing and adequate support for normal roofing equipment.

U.S.G. roof decks with long, clear spans require fewer bar joists than steel decks to resist uplift forces which can cause damage to roof coverage and deck. To provide the necessary protection for Types A and B steel decks, Factory Mutual Specification 1-28 for Class I Construction requires added bar joists—also more roof insulation to resist damage to deck caused by foot traffic. Safety factors are also designed into gypsum deck components. They don't have to be added later when cost is greater.



Open-web construction allows gypsum fill to flow through truss tee so it is embedded in a solid mass of gypsum concrete. This, plus welding of truss tee to supports, provides strong composite resistance to shear and uplift. The mesh reinforces the deck and transfers tensile stress. Cracking and deflection caused by impact and seismic shock are minimized.

UL Wind Uplift Class 90 has been assigned to a poured gypsum concrete roof deck assembly based on qualified testing. The system tested consisted of PYROFILL Gypsum Concrete over SHEETROCK Formboard with bulb tees, KEYDECK mesh and roof covering attached with NAIL-TITE nails. This U.S.G. assembly successfully withstood the rigorous test—while conventional 22-, 20- and 18-ga. steel and lightweight concrete roof deck systems have not. Extended coverage insurance rates are generally lower for assemblies having passed the test, especially in Gulf Coast and Prairie States where high wind velocities are prevalent.

In hurricane areas, standard gypsum roof decks have withstood as many as five fierce blows without damage. This is because U.S.G. roof decks resist uplift action by nearly four times the normal requirements of 35 psf when constructed with bulb or truss tee sub-purlins welded to the framing.

In earthquake zones, U.S.G. poured gypsum decks with truss tees and reinforcing mesh have withstood some of the most severe tremors. They have been approved as rigid diaphragms in Los Angeles and in many of the 1,000 cities which use the Uniform Building Code. See U.S.G. Bulletin IR-61 for complete design and supporting test information.

Design Versatility

high-performance components meet design requirements, offer low life-cycle costs

Whatever your roof deck requirements—energy savings, noise control, fire protection, superior structural strength—U.S.G.'s gypsum roof decks will meet your construction needs at low life-cycle costs. Whether you select poured or precast gypsum decks or drainage slopes, you can be sure components are perfectly matched as part of an integrated system. They have been developed to achieve optimum results based on extensive tests and job-proven performance.

With this versatility, you can design buildings of unique and distinctive appearance with no sacrifice of construction efficiency.

GENERAL TIME BUILDING, Stamford, Conn.

...in poured gypsum decks

PYROFILL and THERMOFILL Gypsum Concrete can be shaped to virtually any roof configuration—curved pitched, sawtooth, angled or flat. Where long unsupported spans are needed (warehouses, shopping centers, gymnasiums), poured gypsum concrete with prestressed concrete structural elements provides:

- Clear spans up to 100 ft. with shallow depth
- Fire-rated construction without added fireproofing
- Simplicity of construction for fast erection
- Economical initial cost

...in prefabricated gypsum plank

High-strength and water-resistant USG Metal Edge Gypsum Plank, a dry system, is suitable for steeply pitched and mansard roofs (see page 18 for details).

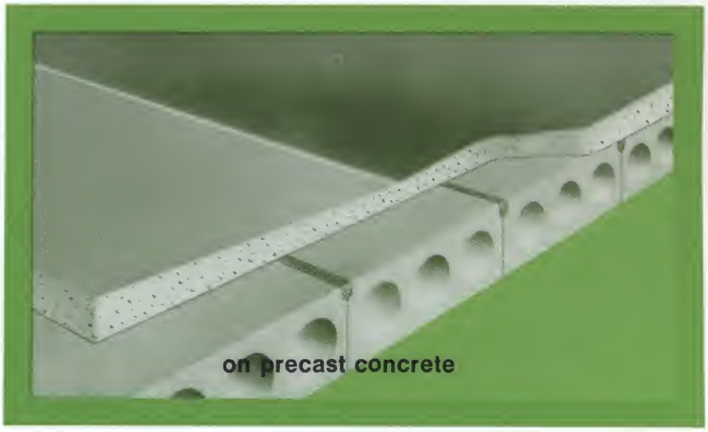
Lightweight, laminated SPAN-ROCK Gypsum Plank offers simple, dry installation on steel sub-purlins for flat, pitched and fire-rated decks (see page 19 for details).

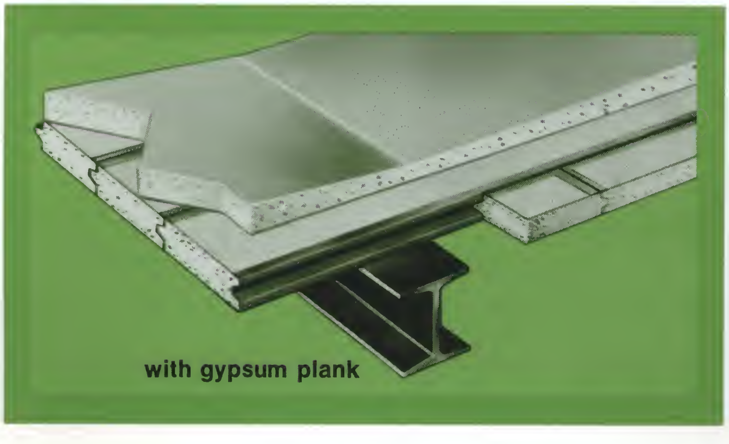
...in drainage slope fills

PYROFILL or THERMOFILL Poured Gypsum Concrete drainage slopes can be poured in hot or sub-freezing temperatures. They permit use of equal-height columns and level-deck framing, simplifying building design and reducing steel fabrication costs. Slopes to meet drainage requirements are readily provided with the screeded fill. When future building expansion requires change from a deck to a floor, the fill can be removed. In reroofing, poured slopes provide an easy way to pitch dead-level roofs that won't drain.

continued

with cast-in-place concrete

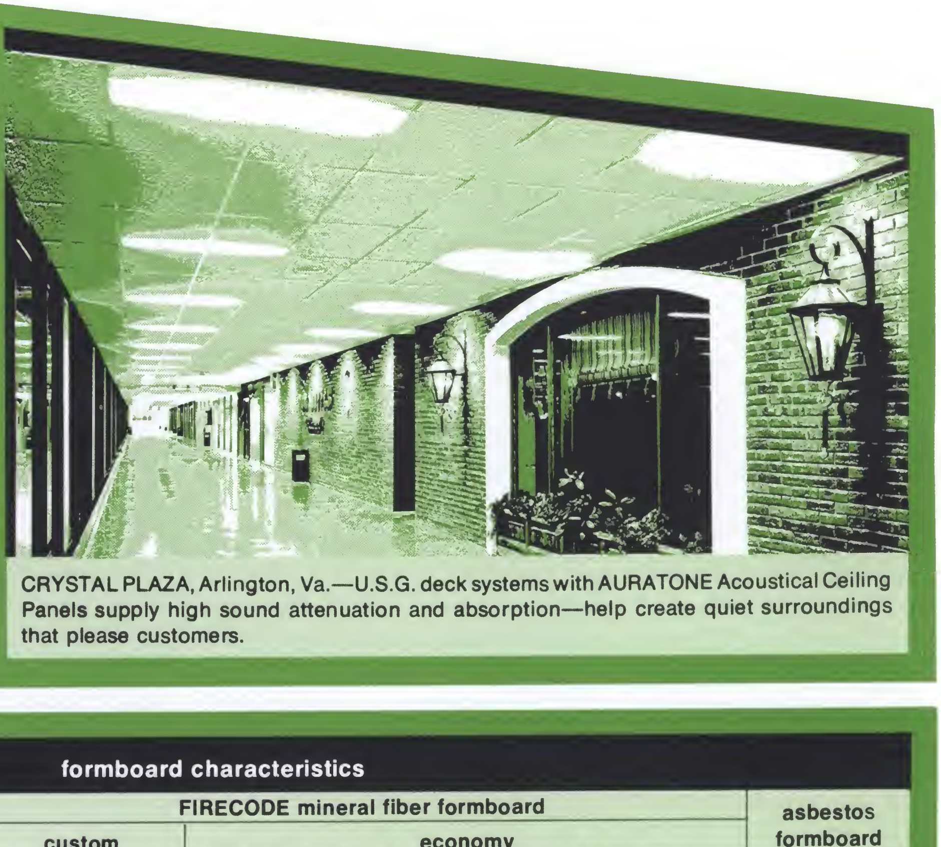

on precast concrete


with gypsum plank

over old roof covering

...in formboards—concealed or exposed

Four different U.S.G. Formboards meet a wide variety of interior and functional design requirements. They are used singly or in combination on a project to provide sound control, insulation, greater fire protection, economy or attractive appearance in exposed ceilings. They serve both as a formboard for the poured gypsum concrete and, when needed, as finished ceilings eliminating costs of additional ceiling material. Their superior fire protection eliminates need for added fireproofing materials and often reduces insurance costs.

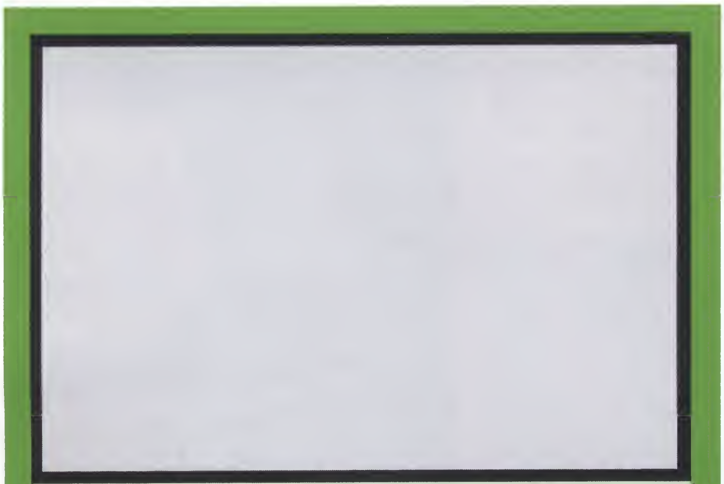


CRYSTAL PLAZA, Arlington, Va.—U.S.G. deck systems with AURATONE Acoustical Ceiling Panels supply high sound attenuation and absorption—help create quiet surroundings that please customers.

formboard characteristics

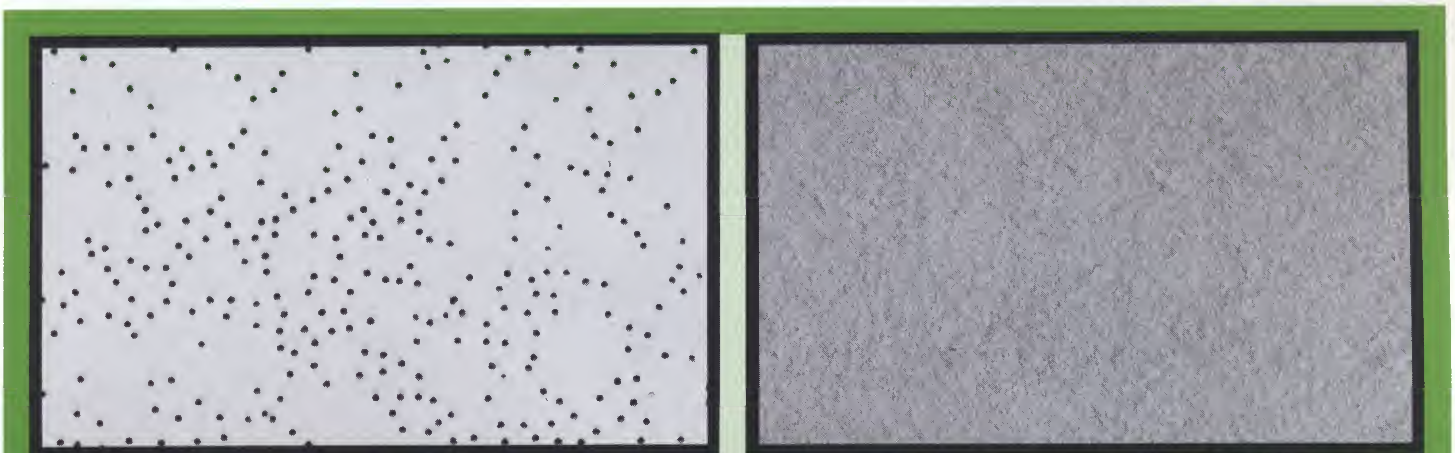
type	SHEETROCK formboard	FIRECODE mineral fiber formboard				asbestos formboard
		custom	economy			
thickness	½"	1"	¾"	1"	1½", 1¾", 2"	¼"
width	32"	32" & 24"	24"	32" & 24"	32" & 24"	32"
length	up to 12' max.	4' to 6'8"	4' to 6'8"	4' to 6'8"	4' to 8'	48"
weight/sq. ft.	2.025	1.65	1.05	1.40	2.15, 2.50, 2.85	2.4
R-value	0.45	3.70	2.78	3.70	5.55, 6.48, 7.40	0.06
flame spread	15-20(1)	5-10(2)		0-5(2)		0-5
noise reduction coefficient	—	.50		.40		—
light reflection coefficient	.66	.65		—		.40
specification compliance	ASTM C318-67 Federal Spec. SS-L-30D Type V	Federal Spec. SS-S-118a Class 25	Federal Spec. SS-S-118a Class 25 (noncombustible)			Federal Spec. SS-B-755a Type U

(1) Flame spread ratings determined by Underwriters Laboratories testing. (2) Flame spread rating determined by Southwest Research Institute.



For fire ratings and durability, **SHEETROCK Formboard** is a rigid gypsum board, treated to resist mildew effectively where adequate ventilation is provided. Two-hour fire ratings and 46 STC are available with 2-in. gypsum slabs and exposed tees. Meets most roof deck needs, concealed or exposed.

For long-lasting moisture resistance, **USG Asbestos Cement Formboard** is a rigid, industrial type board that provides more resistance to heat and humidity than other formboards. Ideal for use on exterior soffits and above heat-producing machinery where temperatures at the board are less than 125°F.



For thermal insulation, 2-hour fire ratings and sound control features, **FIRECODE Formboard** is a rigid, highly insulative board made of mineral fiber which does not contribute to mildew growth. Reduces reflected noise—provides up to .50 NRC (see table, pg.16). Available in two types:

Custom, with a white factory-applied finish; used for high ceilings that require a semi-finished surface with built-in acoustical properties and good light reflectance.

Economy, with a natural matte surface and medium tan color. Ideal for concealed areas where a ceiling will be suspended below the deck or where ceiling appearance is not an important factor.

U.S.G. contractors approved

Installed by experts

The contractor who installs a U.S.G. poured roof deck is U.S.G. trained and approved. He's a specialist who is skilled and experienced in all phases of roof deck construction. He has the "know-how" for smooth coordination with other trades. He uses quality U.S.G. products...famous throughout the building business for reliable performance.

You benefit from expert consultation, dependable operation, and complete satisfaction. And you have greater control of construction with unit responsibility centered in one applicator.

Roof deck installation is a job for skilled craftsmen. You can rely on the quality of U.S.G. roof deck systems and the assistance of your approved U.S.G. roof deck contractor.

For detailed specification and installation data, see U.S.G. technical folders SA-305 (in Sweet's General Building File, Sec. 3.4), SA-306 and IR-564.

UNITED STATES GYPSUM
BUILDING AMERICA
101 South Wacker Drive, Chicago, Illinois 60606

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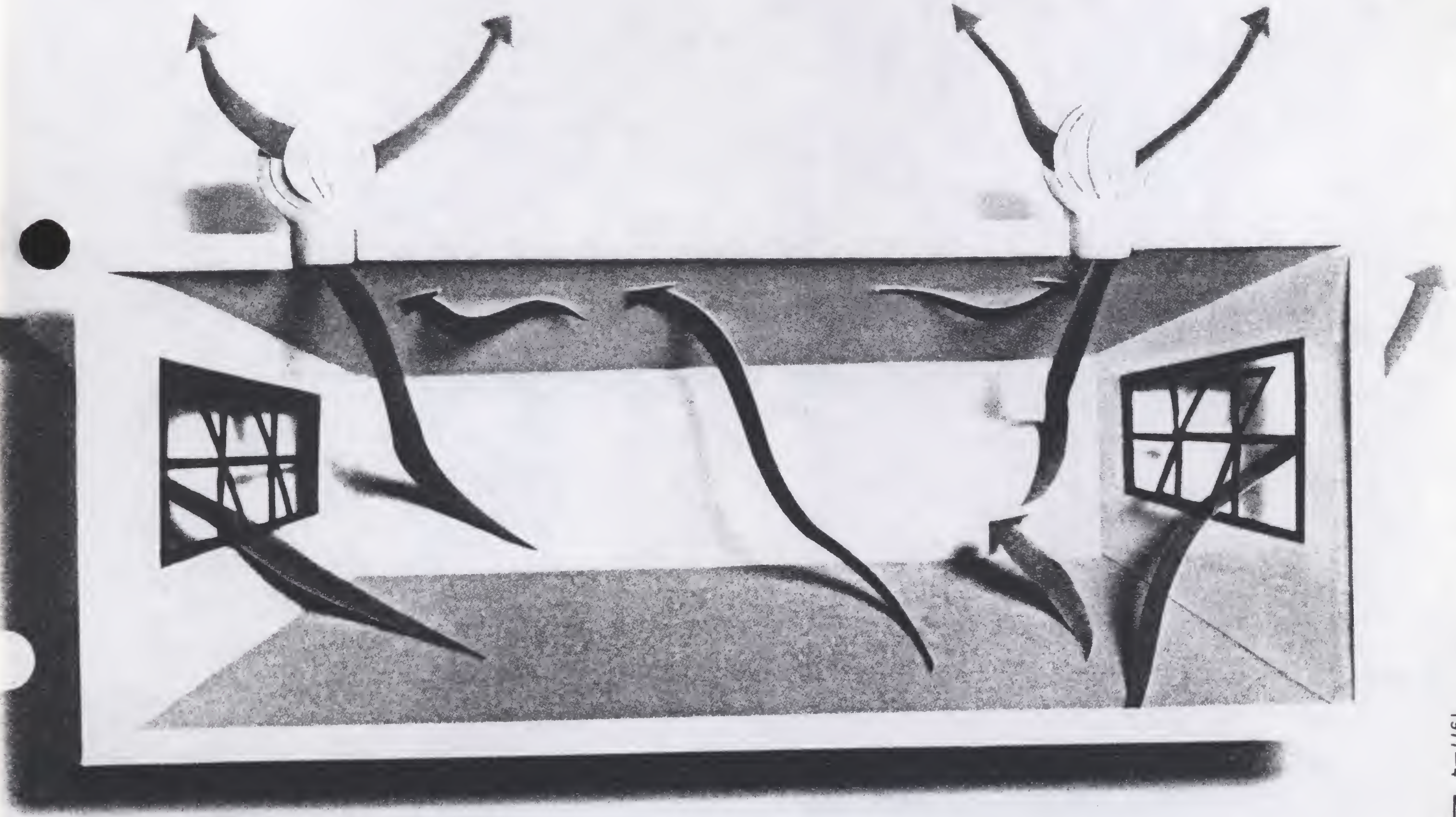
MANUFACTURER'S
RECOMMENDATIONS FOR

DRYING & VENTILATION

U.S.G. poured gypsum roof decks

UNITED STATES GYPSUM



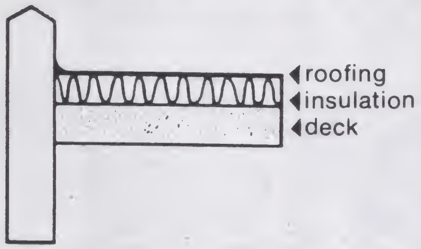
UNITED STATES GYPSUM
1977–4

3 P

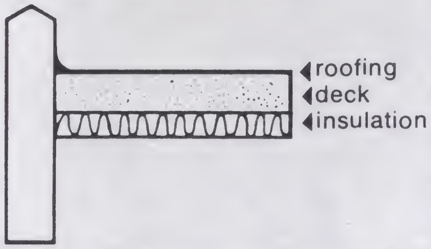
CEMENTITIOUS DECKS
poured gypsum deck

GYPSUM FEARS NO FIRE

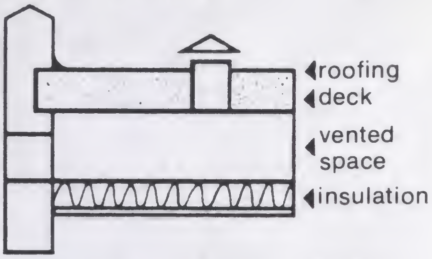
INSULATION ABOVE DECK



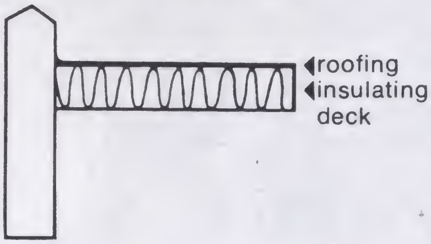
INSULATION UNDER DECK



INSULATED CEILING—
VENTED PLENUM



INSULATED PLANK DECK



A vapor barrier can be installed between the insulation and the roof deck to stop the vapor before it enters and saturates the insulation, which would cause the insulation to lose its thermal resistance. If the insulation is provided by the formboard, critical dew point temperatures often occur below the slab. Any insulating deck material requires care in building dehumidification to avoid condensation. Condensation in the formboard may affect its strength and cause discoloration.

INSULATION ABOVE DECK

This type of construction protects the building elements from wide differential temperatures, thereby minimizing expansion and contraction. It also isolates the roofing from possible deck movements. A wide choice of roof insulation types is available.

The dew point is usually above the vapor barrier in the insulation; however, if the dew point should occur in a gypsum slab, the slab's performance is relatively unaffected by the alternate wetting and drying. A warm-side vapor-barrier can be provided when occupancy and climate dictate. This type of design requires ventilation, especially during construction.

INSULATION UNDER DECK

This system provides the most economical insulation for exposed decks. Acoustical treatment can be provided if desired. High temperature differentials occur in the slab components, making them more susceptible to movement. The dew point will usually occur in the slab during winter conditions. Vapor may condense in the slab and induce dripping and dampness in the formboard, resulting in reduced insulative value. Ventilation to lower the relative humidity and vapor pressure of the interior is mandatory. Prolonged exposure to high humidities may cause bond failure between slab and the formboard, or excessive deflection of the formboard.

INSULATED PLANK DECK

The advantage of this system is the acoustical and insulative value provided at no extra cost. The main disadvantage is location of the vapor barrier (roofing membrane) on the top side. Since the dew point will be within the insulation with no provisions against vapor permeating it, condensation can occur, lowering the insulative value and causing deflection. If excessive deflection results from moisture, the roofing can be directly affected, since the stresses will be induced directly into it.

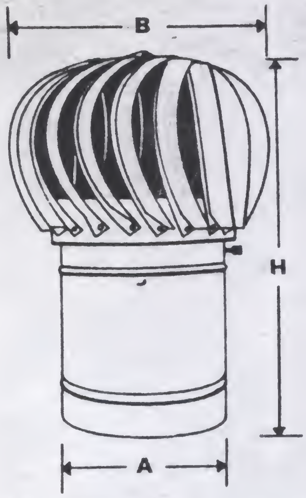
This system requires a draft barrier over the exterior wall if the deck is cantilevered: also ventilation to prevent saturation of the insulation.

INSULATED CEILING—VENTED PLENUM

Lower initial installation cost and lower operating cost for heating and cooling are prime benefits of this system. Any moisture introduced into the plenum from either the slab, exterior or other sources must be removed to prevent condensation. This may be accomplished by circulating the room air through the plenum, back to the heating/cooling system.
The slab will require roof insulation with this method.

With insulated ceiling and vented plenum, a vapor barrier is needed in the ceiling. Heat loss through the ceiling is small; thus the plenum is subjected to cool temperatures during the winter. However, plenum temperature will be slightly higher than the exterior, causing higher vapor pressure in the plenum which will force the vapor to the exterior. This moisture discharged may be inadequate, depending on the temperature differential between the plenum and the exterior. The drying rate of the slab may be slower, under some conditions. When this design is used, consideration should also be given to possible expansion in the steel framing caused by greater plenum temperature variations.

TYPICAL SPINNER VENTILATOR PERFORMANCE



dimensions (in.) A	B	H	exhaust (cu. ft. hr.) wind—5 mph	weight (lb.)
4	7½	13½	11,000	4
6	10	16½	15,000	6
8	12½	20	21,600	10
10	15½	23	32,500	16
12	17½	26	46,200	18
14	21	30½	50,000	26
16	24	33½	72,000	36
18	26	35½	102,100	44
20	29	40	125,600	52
24	35	51	185,000	98

VENTILATION DESIGN

Plenums are a major source of moisture problems when no provision for ventilation is made. They should always be vented regardless of the type of construction. Adjustable vents or louvers dissipate large volumes of construction moisture immediately and are later reduced to vent normal building moisture to the outside.

Various considerations apply to the design of ventilation, such as fire walls and plenum partition cutoffs, overall building design, vent locations, occupancy and cooling requirements. The ventilation requirements of a building should be determined by competent design consultants.

An example of ventilation design for a poured gypsum deck with a suspended ceiling follows. The calculations are not for application to an actual structure but for illustrating ventilation design methods.

Example:
80-ft. x 125-ft. building—10,000 sq. ft.
plenum depth—16 in.
avg. drying time, 2 in. gypsum roof slab —60 days
plenum temp.—75° F @ 50% RH
moisture discharged into plenum—

$$\frac{\text{area x wt. water/sq. ft.}}{\text{drying time}} =$$

$$\frac{\text{10,000 sq. ft. x 5.2 lb./sq. ft.}}{\text{60 days x 24 hr./day}} = \text{36.1 lb./hr.}$$

36.1 lb./hr. x 7000 grains/lb. = 253,000 gr./hr.

from psychometric chart—
air @ 75°F and 50% RH = 64.3 gr. water/lb. dry air and 13.66 cu. ft. vol.

$$\frac{64.3}{13.66} = \text{4.7 gr./cu. ft.}$$

air @ 75°F and 100% RH = 132 gr. water/lb. dry air and 13.9 cu. ft. vol.

$$\frac{132}{13.9} = \text{9.5 gr./cu. ft.}$$

air can hold additional 4.8 gr./cu. ft.
plenum vol.—10,000 sq. ft. x 1.333 ft = 13,330 cu. ft.
total capacity, water in plenum—13,330 cu. ft. x 4.8 gr./cu. ft. = 63,980
air changes req'd.—

$$\frac{253,000}{63,980} = \text{3.95/hr.}$$

(round off to 4 changes/hr.)
total air changed—13,330 x 4 = 53,320 cu. ft.

The required ventilation can be provided with one 16 in., two 10 in. or four 6 in. spinner vents. The smaller gravity vents (spinner) will give better distribution of air removal with less dead space in the plenum. Inlet vents are best located in the plenum wall and must be equal to or greater in cross-section area than the roof ventilators.

The wall inlets should be located on the prevailing windward side of the building and the roof ventilators outside of the vacuum area adjacent to the windward side. Mechanical roof ventilators are not affected by the direction of the wind.

If the interior of the building requires more ventilation than the plenum, room air can be drawn into the plenum through ceiling vents and out through roof vents. The ceiling vents must be equal in area to the roof vents. Outside air must be supplied into the heating/air conditioning system to equalize volume removed by roof vents.

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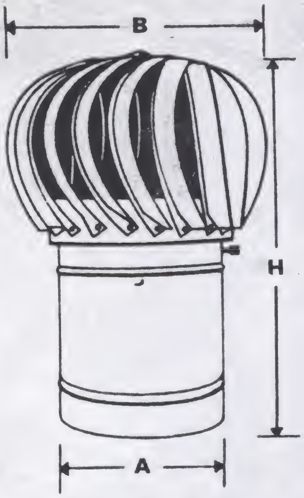
TYPICAL SPINNER VENTILATOR PERFORMANCE



dimensions (in.)			exhaust (cu. ft. hr.) wind—5 mph	weight (lb.)
A	B	H		
4	7½	13½	11,000	4
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10	15½	23	32,500	16
12	17½	26	46,200	18
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16	24	33½	72,000	36
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Example:
80-ft. x 125-ft. building—10,000 sq. ft.
plenum depth—16 in.
avg. drying time, 2 in. gypsum roof slab —60 days
plenum temp.—75° F @ 50% RH
moisture discharged into plenum—

$$\frac{\text{area x wt. water/sq. ft.}}{\text{drying time}} =$$

$$\frac{10{,}000\text{ sq. ft. x }5.2\text{ lb./sq. ft.}}{60\text{ days x }24\text{ hr./day}} = 36.1\text{ lb./hr.}$$

36.1 lb./hr. x 7000 grains/lb. = 253,000 gr./hr.

from psychometric chart—
air @ 75°F and 50% RH = 64.3 gr. water/lb. dry air and 13.66 cu. ft. vol.

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DRYING TIME (DAYS)	drying conditions			
formboard type	still air 80°F-32% RH	moving air 80°F-32% RH, 3MPH	still air 108°F-30% RH	still air 42°F-75% RH
½" SHEETROCK®	36	32	27	120
1" FIRECODE®	32	27	18	88

VAPOR PRESSURE DIFFERENTIALS (LB./SQ. Ft.)

outside temp. (100% RH)	inside temp. 70°F		
	100% RH	50% RH	25% RH
– 10	50.7	24.6	11.5
0	49.6	23.5	10.4
+ 20	45.0	18.9	5.7

THE NEED FOR VENTILATION

The great amounts of water introduced by the elements of a new structure are, in many instances, grossly underestimated. Even with adequate ventilation, the removal of this moisture to a balanced or stable condition may take prolonged periods of time. Typical moisture amounts released by building elements are:

4" concrete slab	2.1 psf
½" plaster coat	0.7 psf
2" poured gypsum slab	5.2 psf
heating oil	6.0 lb./ gal. burned
natural gas	9.0 lb./ 100 cu. ft. burned

In addition, moisture from ground water, terrazzo and extraneous sources may be given off to the building's interior in the form of vapor and, if not removed, may condense on surfaces cooler than dew point temperature.

Warm, moist air rises; therefore, the ceiling or roof deck of the structure is often exposed to extremes of temperature and humidity. For this reason, the roof deck is usually the last element of the construction to dry.

Poured gypsum decks dry through the formboard which dissipates the moisture to the interior of the building as vapor. The rate of drying depends on prevailing conditions and permeability of the formboard (see below).

Unless the water vapor transmitted through the formboard is dispersed into the atmosphere at the deck's undersurface, moisture is retained in the deck. Movement of air at the deck's undersurface greatly enhances evaporation of this moisture.

Like other building materials, roof deck components subjected to prolonged moisture may incur mildew, staining, crystalline breakdown or rust. Adequate ventilation prevents such problems and usually is easily incorporated into the building design.

Even so-called dry construction is not immune to these effects. In a building having 4 in. concrete slab on grade, 3 in. concrete second floor, second-story ceiling of acoustical tile adhesively attached to gypsum panels with 3 in. insulation above (vapor barrier side down), and steel deck with minimum insulation, moisture damage was evident. After the damage to the ceiling was noted, investigation revealed ice on the underside of the steel deck and insulation blankets saturated with moisture. Ventilation consisted of a 12x12 in. wall vent at one end of the plenum.

MOISTURE PRINCIPLES

Warm air has a greater capacity for water vapor than does cool air. If warm, moist air is cooled to a temperature where it can absorb no more moisture, it will release the excess moisture, either in the form of fog, or as condensation beads on cool surfaces. This critical temperature is known as the *dew point*. The relationship between the amount of moisture that air contains and the amound of moisture it can hold when saturated is known as the *relative humidity* (RH).

Vapor pressure is a function of the temperature and relative humidity. The power that drives a steam locomotive is an example of intense vapor pressure. The higher the temperature and relative humidity, the greater the vapor pressure. Where a differential vapor pressure exists between two adjacent areas, water vapor will travel to the area of lower vapor pressure. Differential vapor pressures between outside and inside areas at different temperatures and relative humidities are shown below:

VAPOR BARRIERS & INSULATION

In the winter, with high interior vapor pressures, moisture attempts to travel through the roof system to equalize with the lower exterior pressure. The air voids in the components gain moisture as the vapor travels through. At a point where the moisture-laden air reaches the dew point may occur in the center of a material, but condensation usually forms on an impermeable surface or the cool side of the material.

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USG®
service ceiling with gypsum concrete

Service Ceiling Products by United States Gypsum
101 S. Wacker Dr., Chicago, Ill. 60606

description

Gypsum concrete service ceilings are lightweight, noncombustible ceiling mezzanines suspended from the floor structure above to create an interstitial space for the locating and servicing of all utilities and mechanical equipment. U.S.G. Gypsum Concrete Service Ceilings consist of PYROFILL* Gypsum Concrete poured over formboards and supported on truss tee sub-purlins. This poured-in-place (wet) system is outstanding for economy, performance and ability to meet seismic requirements. All partitions except smoke barriers and 2-hr. fire-rated walls usually terminate at the service ceiling.

Design Advantages—U.S.G. Gypsum Concrete Service Ceilings are easily sealed when space above is used as a plenum—are effective in sound and vibration control. Finish ceiling variations are possible without affecting floor surface.

The uniform height of service ceilings allows unrestricted freedom in locating—and relocating—partitions below; utility lines may be moved without restriction. Support framing and sub-purlins may be spaced to suit any module. The entire service assembly adds about 12 psf, or about 50% less dead load with gypsum components than with other materials offering comparable performance.

Limitations—Gypsum concrete service ceilings are suitable for normal temperature and humidity conditions—where abnormal conditions are expected, consult U.S.G. for recommendations. Acid fumes, generally not harmful to gypsum, may affect framing materials.

Service ceilings are intended only for walking and for construction live loads; all utility and mechanical equipment located in the interstitial space is to be supported from structural framing members or the floor above. These ceilings should not be used for material storage.

technical data

Dry Density—PYROFILL 48-50 pcf.

Compressive Strength—500 psi.

Coefficient of Linear Expansion—.0000085/in./in./F°.

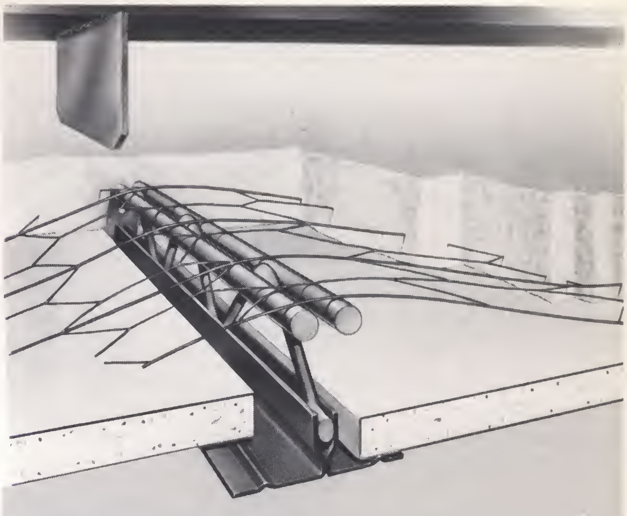
Fire Resistance—Rated noncombustible.

Conformance Standards—Comply with ANSI A59.1-1968(R1972) and ASTM C317-64(1970) Standards.

SHEETROCK* formboard characteristics

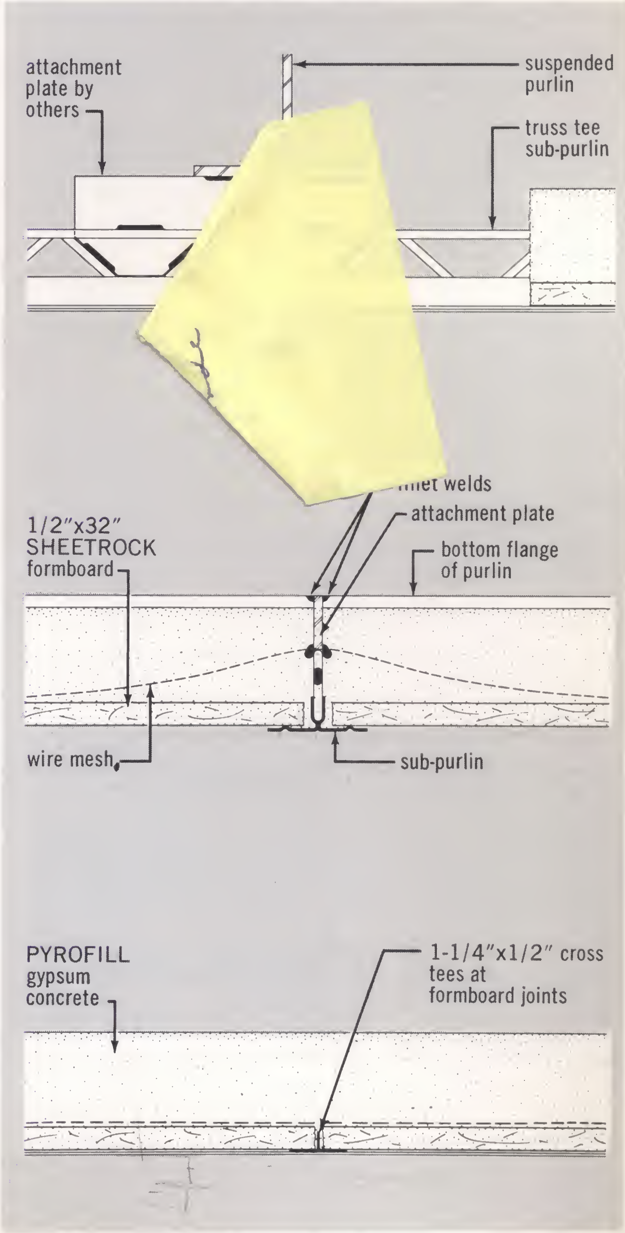
thickness	½"
width (for these systems)	24", 32"
length	6', 8'
flame spread (1)	15-20
light reflection coefficient	66%
specification compliance	ASTM C318-67 C472-70 Federal Spec. SS-L-30c Type V

(1) Flame spread ratings determined by Underwriters' Laboratories testing.



poured gypsum concrete

truss tee suspension
gypsum concrete poured in place (wet)



2.2 mixes

Gypsum concrete shall be mixed with clean water only, using 8½ gal. per 80 lb. PYROFILL Concrete.

Part 3: execution

3.1 placement of supporting framework

Prior to starting installation, the service ceiling contractor shall arrange with others for placement of hangers and light beam supporting framework to acceptable spacing tolerance.

3.2 sub-purlin installation

Anchor sub-purlins to lower flanges of light beam purlins. Attach sub-purlins at each support with appropriate clips or welds. Stagger line of sub-purlin end joints, all of which must occur at supports.

3.3 formboard installation

Place formboards on sub-purlin flanges with support for all ends and cross joints. Install cross tees to support formboard joints not over a support. Place formboard only as required for pouring the same day, remove and discard any left in-place overnight.

3.4 reinforcement mesh

Place mesh with heaviest wires perpendicular to sub-purlins. Lap mesh at least 6″ at ends, 3″ at sides. Cut mesh to fit all walls and openings, and carry mesh into all areas where PYROFILL Gypsum Concrete is to be poured.

3.5 gypsum concrete installation

Mix PYROFILL Gypsum Concrete and pour over formboard to min. depth of 2″, and min. depth over sub-purlins of ¼″. Screed to a smooth, level surface. Leave service ceiling floor surface free and clean for other trades.

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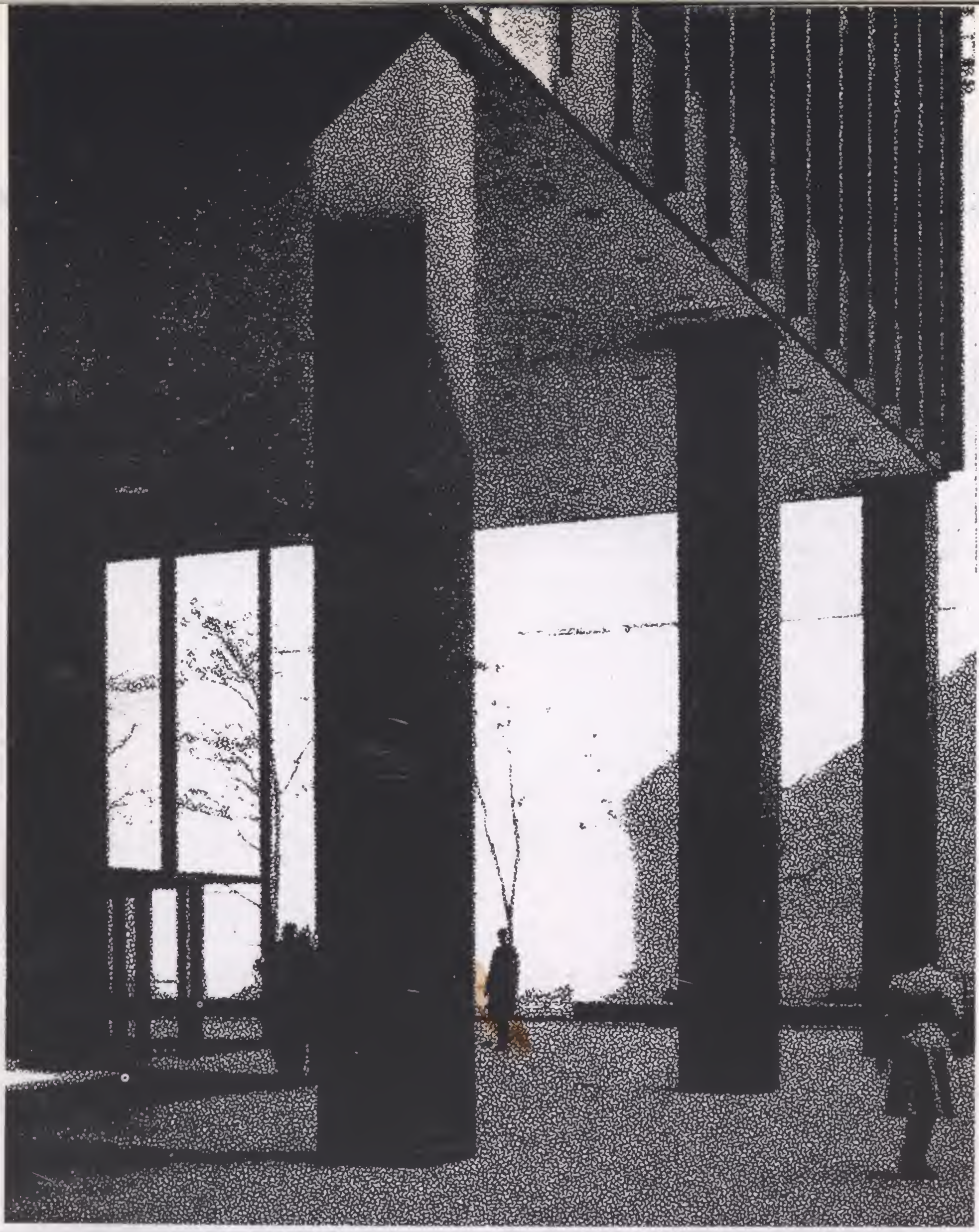
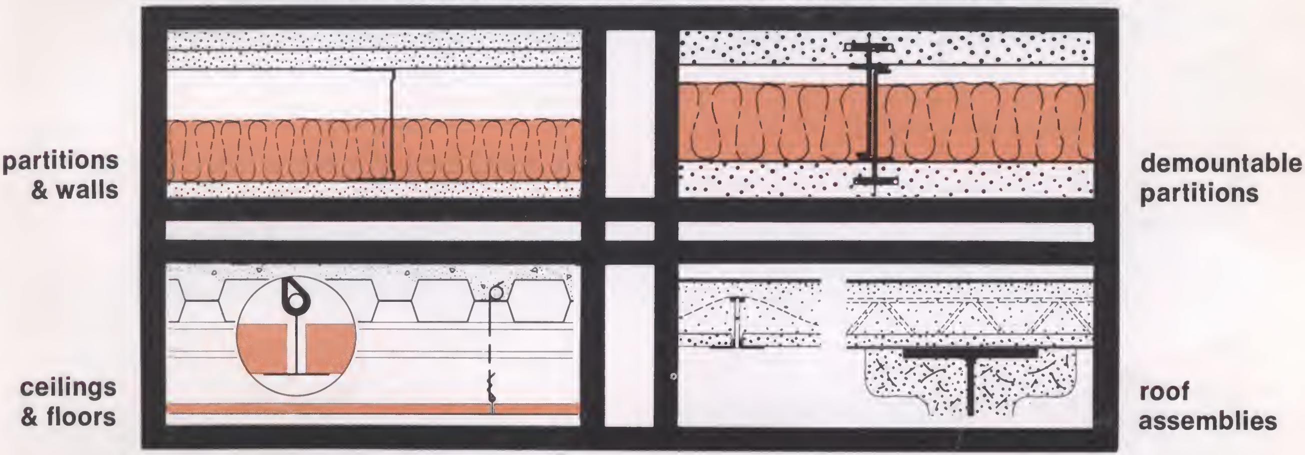
9.5/Ua





construction selector

This Construction Selector summarizes the many effective systems that can be constructed with United States Gypsum quality-tested building products. Complete technical information, organized for efficiency of use, is presented *according to the end result desired by the architect.* It serves as a general guide for initial comparison and selection of systems and as an index to the various system and product folders in this series providing more complete data.

UNITED STATES GYPSUM

UNITED STATES GYPSUM
1977-1

1 D

SCHEDULES & RECORDS
fire & sound ratings

Contents
U.S.G. technical information

This 24-page Selector is the first element, and the key reference index, in the U.S.G. Architectural Technical Literature series. Following is the sequence of other folders comprising the complete series. Section identification is shown for folders located in Sweet's 1977 General Building File; those marked "O" appear in other Sweet's files. The numeral before each division title indicates the UCI Uniform System division classification. Copies of all folders listed are available through U.S.G. sales offices or by mail (in Sweet's, see Literature Directory following this Selector).

The System Folders and Building Product Catalogs are arranged in numerical sequence, as listed below. The first numeral in the title number is the appropriate division number (two digits for two-digit division numbers) so that folders are easily filed. All folders are new 1977 editions except those marked (‡) which were new in 1975 or 1976 and not supplied with replacement literature.

#3 Decks, Floors

	Folder description	Sweet's Sec. No.
SA-305	Gypsum Roof Systems	3.4
‡SA-306	Metal Edge Gypsum Roof Plank System	
SA-309	Gypsum Floor Plank Systems	

#5 Grating, Exp. Metals

	Folder description	Sweet's Sec. No.
SA-505	GRATE-X* Gratings	0
SA-506	GRIP STRUT* Gratings	0
SA-510	Light-Gauge Steel Framing	5.3

#7 Insulation

	Folder description	Sweet's Sec. No.
SA-705	Building & Acoustical Insulation	7.14
SA-707	THERMAFIBER* Fire Safety Systems	7.14

#8 Curtain Walls, Doors & Frames

	Folder description	Sweet's Sec. No.
‡KMD-S	KEWANEE Doors & Frames (1)	8.2
SA-805	Exterior Curtain Walls	8.14

#9 Acoustical Treatment

	Folder description	Sweet's Sec. No.
SA-905	Sound Control Ceilings	9.1
SA-907	CDI Environmental Ceilings	9.1

#9 Lath, Plaster

	Folder description	Sweet's Sec. No.
SA-912	Veneer Plaster-Noncombustible Partitions/Ceilings	9.5
SA-913	Wood-Framed Veneer Plaster Partitions/Ceilings	
‡SA-915	TRUSSTEEL* Studs-Gypsum Lath Partitions	
SA-917	Plasters, Bases & Accessories	9.5

#9 Gypsum Drywall

	Folder description	Sweet's Sec. No.
SA-922	Cavity Shaft Wall Partitions	9.5
SA-923	Steel-Framed Gypsum Drywall Partitions/Ceilings	9.5
SA-924	Wood-Framed Gypsum Drywall Partitions/Ceilings/Separation Walls	
SA-925	Wood-Framed Resilient Gypsum Drywall Partitions/Ceilings (1)	9.5
SA-927	Gypsum Panels & Accessories	9.5
SA-928	TEXTONE* Vinyl Gypsum Panels	9.12

#9 Paints, Coatings

	Folder description	Sweet's Sec. No.
SA-933	Paint Products	9.5

#10 Demountable Partitions

	Folder description	Sweet's Sec. No.
SA-1020	ULTRAWALL* Movable	10.1
‡SA-1030	Drywall Demountable	
SA-1040	VAUGHAN WALLS† Drywall	10.1
SA-1070	ACCURATE Toilet Partitions(1)	10.7

#15 Mechanical

	Folder description	Sweet's Sec. No.
‡SA-1510	GLOBE-STRUT* Channel Framing	0

#16 Electrical

	Folder description	Sweet's Sec. No.
SA-1610	GLOBETRAY* Cable Trays	0

(1) Available only as insert in Sweet's.

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*Reg. U.S. Pat. & Tm. Off.

†T.M. of Vaughan Interior Walls, Inc.

Index
products and systems

References listed are *principal* source of information in U.S.G. Architectural Technical Literature series. Repetition or additional data may occur in other folders.

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Acoustical tile, panels, screens....SA-905
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Aluminum trim....SA-928, SA-1020, SA-1030, SA-1040
Area Separation Walls....SA-924
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ASTM Specs....page 23, SA-100

B

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How to use this selector

description of sections

This folder is divided into six sections—A to F—covering the categories indicated below. Within each section are listed brief analyses of major variations of each system, as documented by fire or sound tests, federal specifications or ASTM designations. They are arranged sequentially according to fire ratings—the criterion that most often governs selection.

These analyses are organized to locate the criteria desired at a glance. In Section A, covering fixed and demountable partitions, all information appears under six column headings:

STC rating		physical data construction detail	description & test no.	comments	folder reference
11-f	16-f				

In section B—ceiling systems—headings are revised to show STC and IIC sound ratings. In sections C, D and E—roof assemblies, fireproofing and exterior walls—certain of these columns are not applicable and are omitted.

The analyses applicable to each system, as listed in the first five sections here, are repeated in the individual folder covering that system, indicated by number in the "Folder Reference" column. Full information, details and specifications on the selected constructions also are available in the folders. See contents, page 2, for folder locations.

a partitions—pages 5 to 11—include solid and laminated without studs, steel and wood-framed, fixed and demountable—in gypsum base and veneer finishes, gypsum drywall, and conventional lath and plaster.

b ceilings—pages 12 to 18—include suspended, furred and direct-attachment types, employing drywall, veneer finishes, conventional plaster and mineral fiber tile or panel surfaces with companion floor or roof construction. Air distribution and integrated environmental systems also are offered.

c roof assemblies—page 19—listed are poured gypsum decks, and the prefabricated gypsum plank type, both available with integral ceilings.

d structural fireproofing—pages 20 to 21—shows basic methods of protecting columns and beams with gypsum base and veneer finishes, mineral fireproofing, and gypsum drywall.

e exterior walls and furring—page 22—compares methods of furring exterior walls, including veneer plaster and drywall furring systems, and exterior curtain wall assemblies.

f product catalogs—listed and indexed on page 23—present complete data on components and accessories used in U.S.G. drywall and plaster construction systems. Other subjects: insulation, paint, sound control ceiling products, cable trays, gratings and channel framing, steel doors and frames, metal toilet compartments and screens.

Federal specification and ASTM designation qualifications of U.S.G. products are listed on page 23.

abbreviations

In the test analyses following, the abbreviation "*est*" indicates *estimated;* the abbreviation *N/A* indicates *not applicable* or *not available.* Other abbreviations are classified by columns where they appear:

description and comments

acoust	acoustical	ht	height
alt	alternate	ins	insulating or insulation
alum	aluminum	lamin	laminated
appl	applied	lim	limiting
att	attached	max	maximum
atten	attenuation	met	metal
betw	between	min	mineral or minimum
bd	board	mov	movable
blkts	blankets	nom	nominal
cem	cement	noncomb	noncombustible
chan	channel	o.c.	on center
clg	ceiling	opp	opposite
col	column	oz	ounce
com	common	partn	partition
compd	compound	perim	perimeter
conc	concrete	pl	plaster
constr	construction	plywd	plywood
contin	continuous	prot	protected or protection
corebd	coreboard	qtr	quarter
corrug	corrugated	recom	recommended
cr	cold rolled	reg	regular
ctd	coated	reinf	reinforcement
dbl	double	resil	resilient
dead	deadening	rf	roof
distr	distribution	run	runner(s)
dm	diamond mesh	sep	separate
ea	each	separ	separated
exp	exposed	sf	self furring
fed spec	federal specifications	spec	special
fin	finish or finished	stag	staggered
fireprfg	fireproofing	stl	steel
fixt	fixture	subflr	subfloor
flr	floor	susp	suspended or suspension
formbd	formboard		
freq	frequency	syst	system
fur	furring	thickn	thickness
ga	gauge	unexp	unexposed
galv	galvanized	unfin	unfinished
hex	hexagonal	vert	vertically
hol	hollow	wallbd	wallboard
horiz	horizontally	wd	wood
hr	hour	wt	weight (lb./sq. ft.)

Plaster mixes show plaster content by weight in lb., aggregates by volume in cu. ft.

In details, color background designates materials indicated below:

🟧 Sound-deadening material, or columns.

🟥 Resilient or furring channels.

test no.

noncomb	noncombustible	NBFU	Natl. Bd. Fire Underwriters
Des	Design	ASTM	Amer. Soc. Testing Materials
GA	Gypsum Association	USG	United States Gypsum

The recognized laboratories which performed the tests are noted by abbreviation as follows:

Fire (f)

UL—Underwriters Laboratories Inc.
OSU—Ohio State University
U of C—University of California

Sound (s)

NBS—National Bureau of Standards
TL—Riverbank Acoustical Laboratories
G & H—Geiger & Hamme
CK—Cedar Knolls Acoust. Laboratories
WEAL—Western Electro-Acoust. Lab.
BBN—Bolt, Beranek and Newman
KSO—Kenward S. Oliphant
WL—Wyle Laboratories

sound rating

STC	sound transmission class	IIC	impact insulation class

9.5/Ua

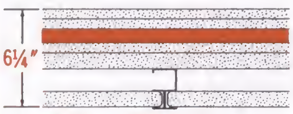
selector guide to sound-rated partitions[1]

STC range	55-60	50-54	45-49	40-44	35-39
drywall assemblies	2, 6, 11, 12, 18, 34, 39	4, 5, 6, 10, 11, 15, 33, 34, 35, 36, 39, 50, 52, 53	6, 8, 9, 10, 13, 19, 36, 37, 38, 42, 44, 45, 58, 49, 50, 53, 54, 55, 56, 58, 59	36, 39, 44, 58, 59, 60	9, 38, 40, 46, 47, 51
plaster assemblies		21, 22, 24, 29, 32	22, 23, 24, 25, 26, 27, 29	28	25

(1) Assemblies identified by numbers in outside margin, pp. 5 to 11.

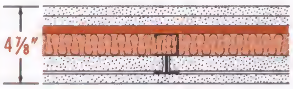
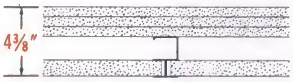
4-hour rated partitions

DRYWALL STEEL-FRAMED ASSEMBLY

STC rating 11-f	STC rating 16-f	physical data construction detail	description & test no.	comments	folder reference	
N/A		 wt. 16 †lim. ht. 15'	Cavity Shaft Wall Gypsum Drywall—2 layers ⅝" SHEETROCK FIRECODE "C" gypsum panels face side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—1" liner panels & ⅝" gypsum panel core screw att to studs—horiz USG met fur chan 24" o.c.—face side panels screw att to fur chan—panels appl vert with joints stag—joints fin—est (f)	Estimated fire rating based on U of C 5-24-74. Rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface	SA-922	1

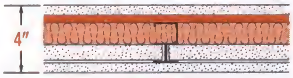
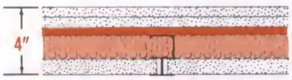
3-hour rated partitions

DRYWALL STEEL-FRAMED ASSEMBLIES

STC rating 11-f	STC rating 16-f	physical data construction detail	description & test no.	comments	folder reference	
	57	 wt. 12 lim. ht. 11'	Cavity Area Separation Wall—⅝" SHEETROCK W/R FIRECODE "C" gypsum panels—1" USG gypsum liner panels set betw USG stl C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels—1½" THERMAFIBER sound atten blkts—single layer panels one side appl vert & screw att—2 layers opp side screw att to chan—base layer appl horiz—face layer appl vert—joints fin—perim caulked—est (f)—BBN-730622 (s)	Estimated fire rating based on U of C 2-16-72	SA-924	2
N/A		 wt. 12 †lim. ht. 15'	Cavity Shaft Wall Gypsum Drywall—3 layers ⅝" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels screw att to side opp liner panels with joints stag—base & face layers appl vert—mid layer appl horiz—joints fin—est (f)	Estimated fire rating based on U of C 2-16-72. Rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface	SA-922	3

2-hour rated partitions

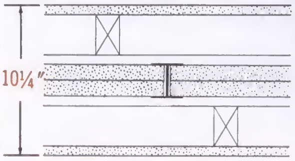
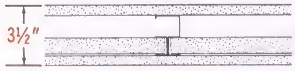
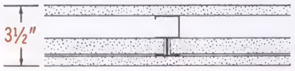
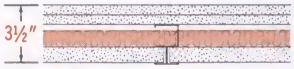
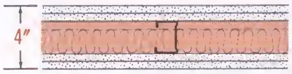
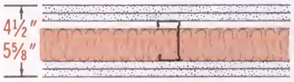
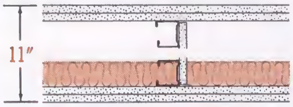
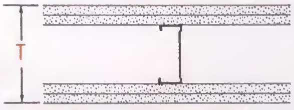
DRYWALL STEEL-FRAMED ASSEMBLIES

STC rating 11-f	STC rating 16-f	physical data construction detail	description & test no.	comments	folder reference	
	50	 wt. 10 lim. ht. 11'	Cavity Area Separation Wall—½" SHEETROCK W/R FIRECODE "C" gypsum panels—1" USG gypsum liner panels set betw USG stl C-H studs 24" o.c.—RC-1 chan 24" o.c. screw att to side opp liner panels—1½" THERMAFIBER sound atten blkts—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—perim caulked—est (f)—BBN-750411 (s)	Estimated fire rating based on U of C 6-23-75	SA-924	4
	51	 wt. 10 †lim. ht. 13'9"	Cavity Shaft Wall Gypsum Drywall—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—RC-1 chan spaced 24" o.c.—1½" THERMAFIBER sound atten blkts—panels & RC-1 chan screw att to side opp liner panels—base layer appl horiz—face layer appl vert—joints fin—est (f)—BBN-750412 (s)	Estimated fire rating based on U of C 2-8-72. Rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface	SA-922	5

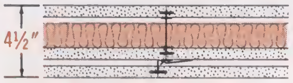
† Based on load of 5 psf; deflection limited to L/240. See System Folder for additional limiting height details.

2-hour rated partitions

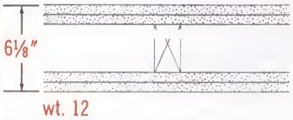
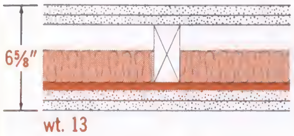
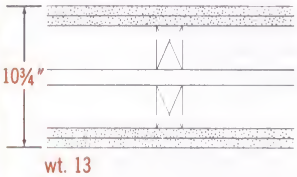
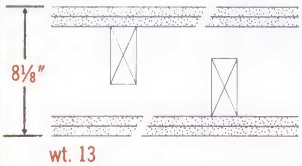
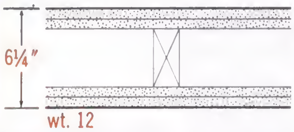
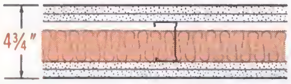
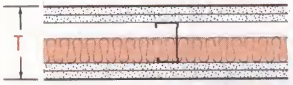
DRYWALL STEEL-FRAMED ASSEMBLIES (continued)

	STC rating		physical data construction detail	description & test no.	comments	folder reference
	11-f	16-f				
6		45(1) 54(1) 57(3)	 wt. 16 lim. ht. 10′	Solid Area Separation Wall—⅝" SHEETROCK FIRECODE "C" gypsum panels—two 1" gypsum liner panels set betw USG stl H-studs 24" o.c.—2x3 16" o.c. ea side on 2x3 plates 1" from liner panels—gypsum panels att with 1¼" Type W screws 12" o.c.—joints stag & fin—perim caulked—est (f)—(1) BBN-730104 (s)—(2) BBN-730103 (s)—(3) BBN-730102 (s)	Est. fire rating based on T-4481-OSU. BBN-730103 based on 2" THERMAFIBER insul. blankets in one cavity. BBN-730102 based on 2" insul. blankets in both cavities	SA-924
7	N/A		 wt. 9 †lim. ht. 15′	Cavity Shaft Wall Gypsum Drywall—½" SHEETROCK FIRECODE "C" gypsum panels—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp sides & fin—U of C 6-23-75 (f)	Construction fire-tested both sides. Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface	SA-922
8		47	 wt. 9 lim. ht. 11′	Cavity Area Separation Wall—⅝" SHEETROCK W/R FIRECODE "C" gypsum panels—1" USG gypsum liner panels set betw USG stl C-H studs 24" o.c.—single layer panels ea side appl vert & screw att—joints stag on opp side & fin—perim caulked—U of C 6-23-75 (f)—BBN-750704 (s)	BBN-750704 based on 1" THERMAFIBER sound atten. blkts. in cavity	SA-924
9		47(1) 39(2)	 wt. 9 †lim. ht. 15′	Cavity Shaft Wall Gypsum Drywall—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels one side —1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels appl vert to side opp liner panels & screw att—joints fin—U of C 3-4-75 (f)—U of C 3-5-75 (f)—(1) BBN-750706 (s)—(2) USG-750302(s) (4-2-75 (4-2-75)	Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface. BBN-750706 based on same constr. with 1" blankets in cavity	SA-922
10		52(1) 45(2)	 wt. 9 †lim. ht. 10′6"	Stl Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2" USG studs 24" o.c.—panels appl vert & screw att—1½" THERMAFIBER sound atten blkts—joints fin—perim caulked—est (f) —(1) TL-69-159 (s)—(2) TL-69-155 (s)	Est. fire rating based on UL Des U412. TL-69-155 based on same construction without blankets	SA-923
11	55(1) 54(2)	54(1) 53(3)	 wt. 10 †lim. ht. 12′ (2½"), 15′6" (3⅝")	Stl Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—2½" or 3⅝" USG studs 24" o.c.—1", 1½" or 2" THERMAFIBER sound atten blkts stapled—panels appl vert & joints stag—base layer screw att—face layer strip lamin or screw att—joints fin—perimeter caulked—UL Des U412 (f)—(1) Field Test KSO-109006-a (s)—(2) USG-114-FT-G&H (s)—(3) CK-654-40 (s)	Best value of drywall-steel stud party walls in 50-54 STC range. Fire rating based on assembly with or without sound atten. blkts. CK-654-40 based on screw-attached face layer	SA-923
12	55		 wt. 11 †lim. ht. 12′3" (24" lim. width)	Stl Stud Chase Wall—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels ea side—1⅝" USG studs 24" o.c. in 2 rows spaced 5¾" apart—½" gypsum panel gussets spanning chase att to studs at qtr points—panels appl vert & screw att—1½" THERMAFIBER sound atten blkts one side—joints stag & fin—perimeter caulked—est (f)—USG-134-FT-G&H (s)	Est. fire rating based on UL Des U412	SA-923
13	46		wt. 11 (T) thickn 5", 6⅛" †lim. ht. 12′ (2½") 15′6" (3⅝") 	Stl Stud—2 layers ⅝" SHEETROCK FIRECODE gypsum panels plain or vinyl faced vert appl ea side—2½" or 3⅝" USG studs 24" o.c.—base layer screw att —face layer lamin or screw att—joints fin or unfin—perimeter caulked—UL Des U411 (f)—TL-60-113 (s)	Excellent for corridors	SA-923
14	N/A		wt. 9 (T) thickn 3⅝" †lim. ht. 9′3"	Stl Stud—2 layers ½" SHEETROCK FIRECODE "C" gypsum panels—1⅝" USG studs 24" o.c.—2 layers ea side vert appl & screw att—joints fin—U of C 6-15-65 (f)	Most economical 2-hour steel stud drywall partition	SA-923

DRYWALL DEMOUNTABLE ASSEMBLY

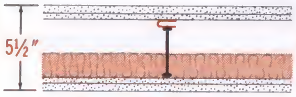
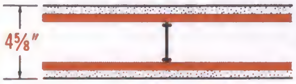
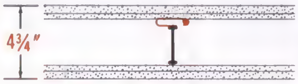
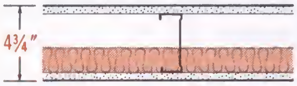
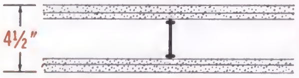
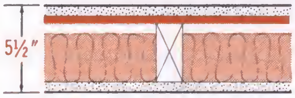
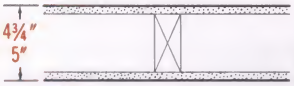
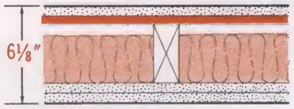
	STC rating		physical data construction detail	description & test no.	comments	folder reference
	11-f	16-f				
15		50	 wt. 12 †lim. ht. 10′9"	Mov ULTRAWALL Partn—concealed "H" studs 24" o.c.—1½" THERMAFIBER sound atten blkts—¾"x 24" bevel edge panels one side—double layer opp side with ¾" Z-Splines betw layers—joints unfin—perim caulked—painted—UL Des U416(f)—TL-70-198(s)	Ideal choice for maximum sound isolation	SA-1020

† Based on load of 5 psf; deflection limited to L/240. See System Folder for additional limiting height details.

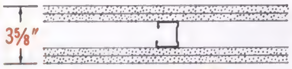
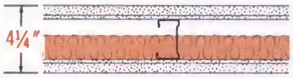
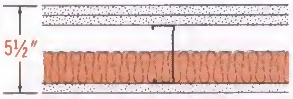
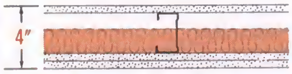
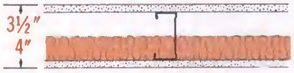
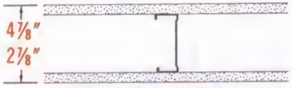
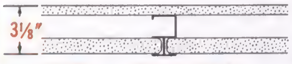
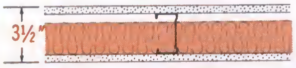
STC rating		physical data construction detail	description & test no.	comments	folder reference	
11-f	16-f					
			DRYWALL WOOD-FRAMED ASSEMBLIES			
N/A		 wt. 12	Wd Stud—2 layers ⅝″ SHEETROCK FIRECODE or W/R FIRECODE "C" gypsum panels—2x4 16″ o.c.—base layer 6d nails 6″ o.c.—face layer lamin or nailed to base—joints fin—UL Des U301 (f)	Basic 2-hour partition construction	SA-924	16
N/A		 wt. 13	Wd Stud—2 layers ⅝″ SHEETROCK FIRECODE "C" gypsum panels ea side—2x4 16″ o.c.—2″ THERMAFIBER sound atten blkts—RC-1 chan one side spaced 24″ o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—joints fin—T-4799-OSU (f)		SA-924 SA-925	17
	56(1) 51(2)	 wt. 13	Wd Stud—2 layers ⅝″ SHEETROCK FIRECODE "C" gypsum panels—2 rows 2x4 16″ o.c. on sep plates 1″ apart—base layer att with 6d ctd nails 16″ o.c.—face layer att with 7d ctd nails 7″ o.c.—perim caulked—joints fin—est(f)—(1) USG-710120(s)—(2) TL-69-214(s)	Est. fire rating based on UL Des U301 USG-710120 based on 3½″ thick blankets in one cavity	SA-924	18
	47	 wt. 13	Stag Wd Stud—2 layers ⅝″ SHEETROCK FIRECODE "C" gypsum panels—2x4 16″ o.c. on 2x6 com plate—base layer att with 6d ctd nails 6″ o.c.—face layer att with 8d ctd nails 8″ o.c.—perim caulked—joints fin—est (f)—TL-69-211 (s)	Est. fire rating based on UL Des U301	SA-924	19
			PLASTERED WOOD-FRAMED ASSEMBLY			
N/A		 wt. 12	Wd Stud—2 layers ⅝″ IMPERIAL FIRECODE "C" gypsum base & 1⁄16″ veneer plaster both sides—2x4 16″ o.c.—base layer 6d nails 6″ o.c.—face layer lamin or nailed to base—joints taped—UL Des U301 (f)	Basic 2-hour partition construction	SA-913	20
			PLASTERED STEEL-FRAMED ASSEMBLIES			
	53	 wt. 10 †lim. ht. 12′	Stl Stud—2 layers ½″ IMPERIAL FIRECODE gypsum base & veneer plaster—2½″ USG studs 24″ o.c.—both layers base appl vert, joints stag & screw att—1⁄16″ IMPERIAL plaster—perimeter caulked—UL Des U303 (f)—CK 654-66 (s)	CK-654-66 based on assembly with 1″ THERMAFIBER sound atten. blankets	SA-912	21
	51(1) 47(2)	wt. 12 (T) thickn 5¼″, 6⅜″ †lim. ht. 12′ (2½″), 15′6″ (3⅝″)	Stl Stud—2 layers ⅝″ IMPERIAL FIRECODE gypsum base & veneer plaster—2½″ or 3⅝″ USG studs 24″ o.c.—base layer screw att—face layer lamin or screw att—joints taped—1⁄16″ IMPERIAL plaster—UL Des U411 (f)—(1) TL-75-73 (s)—(2) TL-75-70 (s)	Sound tests based on 2½″ studs. TL-75-70 based on same constr. with 1½″ THERMAFIBER blankets	SA-912	22
48	49	 wt. 10 (T) thickn 4¾″, 5⅞″ †lim. ht. 12′ (2½″) 15′6″ (3⅝″)	Stl Stud—2 layers ½″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster—2½″ or 3⅝″ USG studs 24″ o.c.—2″ THERMAFIBER sound atten blkts stapled one side—base appl vert & joints stag—base layer screw att—face layer strip lamin or screw att—joints taped—1⁄16″ IMPERIAL plaster—perimeter caulked—UL Des U412 (f)—Field Test KSO-1090072-a (s)	Fire rating based on assembly with or without sound atten. blkts. Field test includes 2 caulked outlets each side	SA-912	23

† Based on load of 5 psf; deflection limited to L/240. See System Folder for additional limiting height details.

1-hour rated partitions

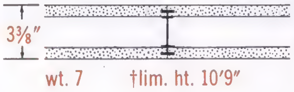
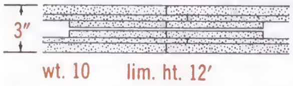
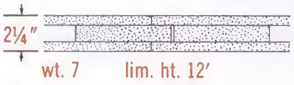
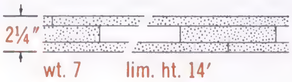
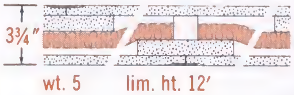
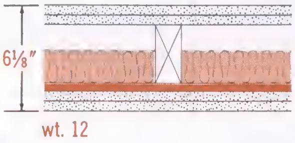
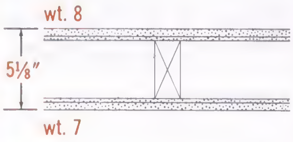
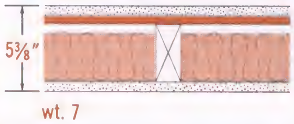
	STC rating		physical data construction detail	description & test no.	comments	folder reference
	11-f	16-f				
				PLASTERED STEEL-FRAMED ASSEMBLIES		
24	49(1) 47(3)	52(2) 46(3)	 5½" wt. 14 lim. ht. 10′	Stl Stud—Resil Gypsum Lath & Plaster—3¼" TRUSSTEEL Studs 16" o.c.—1½" THERMAFIBER sound atten blkts—TR-1 clips one side & TL-1 clips opp side—⅜" ROCKLATH—½" 100:2-100:2 gypsum sand plaster—perimeter caulked—est (f)—(1) USG-125-FT-G&H (s)—(2) CK-664-38 (s)—(3) Field Test KSO-1090072-b (s)	2 caulked outlets on each side in field test	SA-915
25		48(1) 36(2)	 4⅝" wt. 7 lim. ht. 9′6"	Stl Stud—Resil ½" IMPERIAL FIRECODE "C" gypsum base & veneer plaster—2½" TRUSSTEEL studs 24" o.c.—RC-1 chan both sides spaced 16" o.c. att with ¾" Type T pan head screws—base att with 1" Type S screws—1/16" IMPERIAL plaster—joints taped—T-4831-OSU (f)—(1) TL-69-278 (s)—(2) TL-69-288 (s)	TL-69-278 based on assembly with 1½" THERMAFIBER sound attenuation blankets	SA-915
26		46	 4¾" wt. 12 lim. ht. 10′	Stl Stud—Resil Gypsum Lath & Plaster—2½" TRUSSTEEL studs 16" o.c.—TR-1 clips one side & TL-1 clips opp side—⅜" ROCKLATH—½" 100:2 gypsum sand plaster—perimeter caulked—est (f)—TL-69-14 (s)		SA-915
27		45	 4¾" wt. 8 †lim. ht. 14′9"	Stl Stud—1 layer ½" IMPERIAL FIRECODE "C" gypsum base & veneer plaster—3⅝" USG studs—base screw att—1½" THERMAFIBER sound atten blkts stapled one side—joints stag & taped—1/16" IMPERIAL plaster—perimeter caulked—T-3124-OSU (f)—CK-664-1 (s)	Fire test based on assembly with 2½" studs, without blkts. Stud spacing at 16" o.c. recommended	SA-912
28	41		 4½" wt. 13 lim. ht. 15′	Stl Stud—Gypsum Lath & Plaster—2½" TRUSSTEEL studs 16" o.c.—⅜" ROCKLATH—½" 100:2-100: 2 gypsum sand plaster—est (f)—TL-58-7 (s)	Record of proven performance	SA-915
				PLASTERED WOOD-FRAMED ASSEMBLIES		
29	50(2)	49(1)	 5½" wt. 8	Wd Stud—Resil ⅝" IMPERIAL FIRECODE "C" gypsum base & veneer plaster—2x4 16" o.c.—3" THERMAFIBER ins blkts—RC-1 chan one side spaced 24" o.c.—base att with 1" Type S screws—opp side att direct with 1¼" Type W screws—1/16" veneer plaster both sides—perimeter caulked—UL Des U311 (f)—(1) CK-664-4 (s)—(2) USG-111-FT G&H (s)	Good sound isolation combined with highly abrasion-resistant surface. CK-664-4 based on ½" thick base	SA-913
30	N/A		wt. 7  4¾" 5"	Wd Stud—½" IMPERIAL FIRECODE "C" gypsum base att direct & veneer plaster—2x4 16" o.c.—base nailed 7" o.c. 6d nails—1/16" veneer plaster—joints taped—U of C 10-27-64 (f)	Excellent surface hardness and abrasion resistance	SA-913
31	N/A		wt. 7	Wd Stud—⅝" IMPERIAL FIRECODE "C" gypsum base & veneer plaster—2x4 16" o.c.—base nailed 7" o.c. 1⅞" cem ctd nails—1/16" veneer plaster both sides—joints taped—UL Des U305 (f)		SA-913
32		53	 6⅛" wt. 11	Wd Stud—Resil ⅝" IMPERIAL gypsum base & veneer plaster—2x4 16" o.c.—2 layer base one side screw att & lamin—single layer opp side screw att to RC-1 chan spaced 24" o.c.—3" THERMAFIBER ins blkts—1/16" veneer plaster both sides—perimeter caulked—est (f)—CK-654-38 (s)	Est. fire rating based on UL Des U 311	SA-913

†Based on load of 5 psf and studs 16" o.c.; deflection limited to L/240. See System Folder for additional limiting height details.

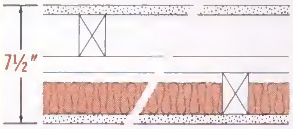
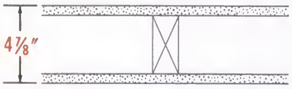
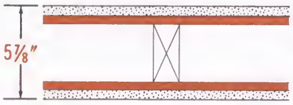
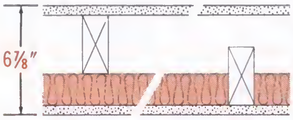
STC rating		physical data construction detail	description & test no.	comments	folder reference	
11-f	16-f					
			DRYWALL STEEL-FRAMED ASSEMBLIES			
	53	 wt. 9 †lim. ht. 9'3"	Stl Stud—2 layers ½" SHEETROCK gypsum panels ea side—1⅝" USG studs 24" o.c.—panels appl vert & screw att—joints stag & fin—perimeter caulked—U of C 9-21-64 (f)—CK-654-40 (s)	Sound test based on 2½" studs & 1½" sound atten. blankets in cavity	SA-923	33
	55(1) 53(2)	 wt. 7 †lim. ht. 12'	Stl Stud—⅝" SHEETROCK FIRECODE gypsum panels—2½" USG studs 24" o.c.—1½" THERMAFIBER sound atten blkts—2 layer—base layer ¼" SHEETROCK panels screw att—⅝" face layer screw att—joints fin—perimeter caulked—est (f)—(1) CK-684-14 (s)—(2) CK-684-13 (s)	Est. fire rating based on T-1174-OSU CK-684-13 based on ½" thick panels	SA-923	34
	50	 wt. 8 †lim. ht. 14'9"	Stl Stud—⅝" SHEETROCK FIRECODE "C" gypsum panels—3⅝" USG studs 24" o.c.—single layer panels one side appl vert & screw att—2" THERMAFIBER sound atten blkts one side—2 layers opp side—panels appl vert & screw att—joints stag & fin—perim caulked—est (f)—USG-241-ST-G&H (s)	Est. fire rating based on T-3362-OSU	SA-923	35
	50(1) 49(2) 41(3) 51(4)	 wt. 7 †lim. ht. 11'6"	Stl Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2½" USG studs 24" o.c.—single layer panels one side appl vert & screw att—1½" THERMAFIBER sound atten blkts one side—2 layers opp side—panels appl vert & screw att—joints stag & fin—perimeter caulked—est (f)—(1) BBN-760401 (s)—(2) TL-69-153 (s)—(3) TL-69-148 (s)—(4) BBN-700726 (s)	Est. fire rating based on T-3362-OSU. BBN-760401 based on 2" blkts. TL-69-148 based on same construction without blkts. BBN-700726 based on 2⅝" thick foil-faced blkts.	SA-923	36
	47(1) 45(2)	wt. 5 †lim. ht. 11'6" 	Stl Stud—½" SHEETROCK FIRECODE "C" gypsum panels—2½" USG studs 24" o.c.—single layer panels ea side appl vert & screw att—1½" THERMAFIBER sound atten blkts one side—joints fin—perimeter caulked—T-3362-OSU (f)—(1) TL-65-158 (s)—(2) TL-69-42 (s)	TL-65-158 based on 3⅝" studs & 1" blankets	SA-923	37
	45(1) 39(2)	wt. 5 †lim. ht. 13'	Stl Stud—½" SHEETROCK FIRECODE "C" gypsum panels—3" USG studs 24" o.c.—single layer panels vert appl & screw att—1½" THERMAFIBER sound atten blkts—joints fin—perimeter caulked—est (f)—(1) BBN-710310 (s)—(2) BBN-710305 (s)	Est. fire rating based on T-3362-OSU. BBN-710305 based on same construction without blankets	SA-923	38
42(1)	52(2)	wt. 6 †lim. ht. 14'9" 	Stl Stud—⅝" SHEETROCK FIRECODE gypsum panels—3⅝" USG studs 24" o.c.—single layer panels vert or horiz appl & screw att 12" o.c.—joints fin—perimeter caulked—T-1174-OSU (f)—GA-WP-45-1 hr (f)—(1) USG-17-FT-G&H (s)—(2) BBN-760704 (s)	Basic 1-hr. corridor—fire tests based on screws 8" o.c. at vert. joints—WP-45 based on horiz. application—BBN-760704 based on 3" sound atten. blankets in cavity	SA-923	39
38		wt. 5 †lim. ht. 8'9"	Stl Stud—⅝" SHEETROCK FIRECODE gypsum panels—1⅝" USG studs 24" o.c.—single layer panels vert appl & screw att 12" o.c.—joints fin—perimeter caulked—U of C 7-31-62 (f) TL-64-29 (s)	Min. 1-hr. drywall partn.—fire test based on screws 8" o.c. at vertical joints	SA-923	40
N/A		 wt. 8 †lim. ht. 13'6"	Cavity Shaft Wall Gypsum Drywall—⅝" SHEETROCK FIRECODE "C" gypsum panels one side—1" USG shaft wall liner panels set betw USG stl C-H studs 24" o.c.—panels appl to side opp liner panels & screw att—joints fin—U of C 3-6-75 (f)—U of C 3-7-75 (f)	Fire rating also applies with IMPERIAL FIRECODE "C" Base and veneer plaster surface 4-3-75	SA-922	41
			DRYWALL DEMOUNTABLE ASSEMBLIES			
49		wt. 6 lim. ht. 12' 	Mov Demountable Partn—½" vinyl faced TEXTONE FIRECODE "C" gypsum panels & battens screw att—2½" USG stl studs 24" o.c.—2" THERMAFIBER sound atten blkts—UL Des U406 (f)—TL-63-127 (s)	Low cost—only steel stud movable partn. with high sound & fire rating	SA-1030	42
N/A		wt. 6 lim. ht. 12'	Mov Demountable Partn—½" SHEETROCK FIRECODE "C" gypsum panels & battens 48" o.c.—panels screw att at joints & adhesively att to alt studs—2½" USG stl studs 24" o.c.—2" THERMAFIBER sound atten blkts—U of C 7-27-70 (f)		SA-1030	43

† Based on load of 5 psf; deflection limited to L/240. See System Folder for additional limiting height details.

1-hour rated partitions

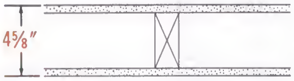
	STC rating		physical data construction detail	description & test no.	comments	folder reference
	11-f	16-f				
				DRYWALL DEMOUNTABLE ASSEMBLIES (continued)		
44		42(1) 47(2)		Mov ULTRAWALL Partn—concealed "H" studs 24″ or 30″ o.c.—¾″x24″ or 30″ bevel edge ULTRAWALL gypsum panels—joints unfin—perim gaskets—U of C 8-18-67 (f)—U of C 7-23-69(f)—(1) BBN-701008(s)—(2) BBN-701216(s)	Variety of style combinations. BBN-701216 based on same construction with 1″ sound atten. blankets	SA-1020
45		45		Mov VAUGHAN WALLS pre-chased sound wall—spec ⅝″ USG gypsum face panels lamin to ⅜″ gypsum base layer panels—½″ gypsum core strips placed to form panel joints—2 rows 1½″ thick—alum trim—U of C 8-12-68 (f)—WEAL 67-131 (s)	Tenant wall with excellent space-saving features	SA-1040
46		37		Mov VAUGHAN WALLS pre-chased partn—spec ⅝″ USG gypsum face panels lamin to spec 1″ gypsum core strips placed to form panel joints—U of C 11-1-66 (f)—WL-73-59160 (s)	Aluminum ceiling and floor runners. Excellent corridor or tenant partition	SA-1040
				DRYWALL LAMINATED ASSEMBLIES		
47		37		VAUGHAN WALLS chase wall fixed partn—⅝″ SHEETROCK gypsum face panels lamin to spec 1″ gypsum core strips at vert joints—U of C 8-6-71 (f)—WL-73-59160 (s)		SA-1040
48		45		VAUGHAN WALLS sound wall fixed partn—two rows ⅝″ SHEETROCK gypsum face panels lamin & stapled to spec 1″ gypsum core strips at vert joints—neoprene isolators & 1″ insul blkts in cavity—est (f)—WEAL 72-148 (s)		SA-1040
				DRYWALL WOOD-FRAMED ASSEMBLIES		
49		59(1) 49(2)		Wd Stud—2 layers ½″ SHEETROCK FIRECODE "C" gypsum panels ea side—2x4 16″ o.c.—3″ THERMAFIBER ins blkts—RC-1 chan one side spaced 24″ o.c.—resil side screw att—opp side nail att—both base layers appl vert and face layers appl horiz—base layers perim caulked—joints fin—est (f)—(1) TL-67-239 (s)—(2) TL-67-212 (s)	Excellent sound control for party walls. Est. fire rating based on UL Des U311. TL-67-212 based on same construction without blankets	SA-924 SA-925
50		53(1) 45(2)		Wd Stud—½″ SHEETROCK FIRECODE "C" gypsum panels—2x4 16″ o.c.—2 layer—base layer ¼″ SHEETROCK gypsum panels appl vert with 4d ctd nails—½″ panels face layer strip lamin—joints stag & fin—perimeter caulked—est (f)—(1) USG-221-ST-G&H (s)—(2) TL-69-52 (s)	221-ST based on ⅝″ lamin. face layers & 1½″ THERMAFIBER sound atten. blankets	SA-924
51	38			Wd Stud—2 layers ⅜″ SHEETROCK gypsum panels lamin & nailed—2x4 16″ o.c.—joints fin—T-118-48-OSU (f)—TL-57-14 (s)		SA-924
52	52			Wd Stud—Resil ⅝″ SHEETROCK FIRECODE "C" gypsum panels—2x4 16″ or 24″ o.c.—3″ THERMAFIBER ins blkts—RC-1 chan one side spaced 24″ o.c.—panels att with 1″ type S screws—opp side direct att with 1¼″ Type W screws—joints fin—perimeter caulked—UL Des U311 (f)—USG-33-FT-G&H (s)	Best value of wood stud drywall party walls	SA-924 SA-925

†Based on load of 5 psf and studs 24″ o.c.; deflection limited to L/240. See System Folder for additional limiting height details.

STC rating 11-f	STC rating 16-f	physical data construction detail	description & test no.	comments	folder reference	
51(1) 49(2)		 wt. 8	Stag Wd Stud—⅝″ SHEETROCK FIRECODE gypsum panels—2x3 16″ o.c.—2x3 plates 1″ apart—panels att with 1¼″ Type W screws 16″ o.c.—2″ THERMAFIBER sound atten blkts one side—perim caulked—est (f)—(1) USG-106-FT-G&H (s)—(2) USG-155-FT-G&H (s)	Best value in 50 STC range for this type of party wall. Est. fire rating based on UL Des U305. 155-FT based on 2x6 plate	SA-924	53
34(2)	46(1)	 wt. 7	Wd Stud—⅝″ SHEETROCK FIRECODE or W/R FIRECODE "C" gypsum panels—2x4 16″ or 24″ o.c.—panels nailed 7″ o.c.—1⅞″ cem ctd nails—joints fin—perim caulked—UL Des U305 (f)—UL Des U314 (f)—(1) BBN-700725 (s)—(2) USG-30-FT-G&H (s)	UL Des U314 based on 24″ stud spacing. BBN test includes 3″ insul. blankets. USG-30-FT based on 16″ stud spacing	SA-924	54
45		 wt. 7	Wd Stud—Resil ⅝″ SHEETROCK FIRECODE gypsum panels—2x4 16″ o.c.—RC-1 chan both sides spaced horiz 24″ o.c. att with 6d nails—panels att with 1″ Type S screws—joints fin—perimeter caulked—T-1396-OSU (f)—TL-60-52 (s)	Fully resilient 1-hr. fire-rated party wall	SA-924 SA-925	55
	45	 wt. 8	Stag Wd Stud—⅝″ SHEETROCK FIRECODE "C" gypsum panels—2x4 16″ o.c. on 2x6 com plate—panels att with 6d ctd nails 7″ o.c.—2″ THERMAFIBER sound atten blkts one side—perim caulked—joints fin—est (f)—TL-69-213 (s)	Est. fire rating based on UL Des U305	SA-924	56

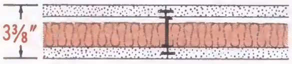
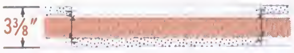
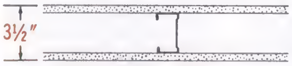
45-min. rated partitions

DRYWALL WOOD-FRAMED ASSEMBLY

N/A		 wt. 6	Wd Stud—½″ SHEETROCK FIRECODE "C" gypsum panels—2x4 16″ o.c.—panels nailed 7″ o.c.—1⅝″ cem ctd nails—joints fin—UL Des U317 (f)		SA-924	57

other partitions

DRYWALL DEMOUNTABLE ASSEMBLIES

	48(1) 40(2)	 wt. 8 †lim. ht. 12′6″	Mov ULTRAWALL Partn—concealed "T" studs both sides 24″ o.c.—¾″x24″ bevel edge ULTRAWALL gypsum panels—1½″ THERMAFIBER sound atten blkts—joints stag & unfin—perim caulked—N/A (f)—(1) TL-70-251 (s)—(2) TL-70-252 (s)	TL-70-252 based on same construction without blankets	SA-1020	58
	46(1) 40(2)	 wt. 7 †lim. ht. 9′6″	Mov ULTRAWALL Partn—concealed H/R-studs both sides 24″ o.c.—¾″x24″ bevel edge ULTRAWALL gypsum panels—1½″ THERMAFIBER sound atten blkts—joints unfin—perim gaskets—N/A (f)—(1) USG-740909 (s)—(2) USG-750206 (s)	USG-750206 based on same construction without blankets	SA-1020	59
42		 wt. 5.5 lim. ht. 12′	Mov Demountable Partn—½″ vinyl faced TEXTONE FIRECODE gypsum panels & battens screw att—2½″ USG stl studs 24″ o.c.—N/A (f)—TL-63-126 (s)	Same as No. 42 without blkts.—note STC difference	SA-1030	60

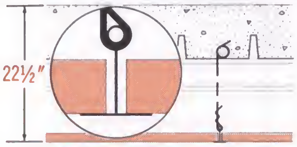
† Based on load of 5 psf; deflection limited to L/240. See System Folder for additional limiting height details.

(For fire and sound test data on other partition assemblies, see U.S.G. Technical Bulletins: CS-6 Metal-Framed Metal Lath and Plaster Systems; DW-56 Solid, Semi-Solid, Vent Shaft Partitions.)

acoustical and air distributing ceilings

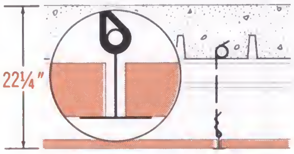
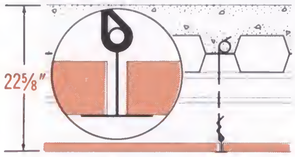
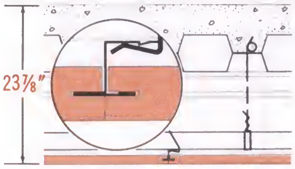
4-hour rated ceilings

MINERAL FIBER SURFACES

	STC rating	physical data construction detail	description & test no.	comments	folder reference
1	45 to 49	 clg wt. 1.2	AURATONE FIRECODE ⅝"x24"x48" acoust clg panels in Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼" THERMAFIBER min wool bd—2½" conc on cellular stl flr—UL Des D206 (f)	Includes 4-hr. unrestrained beam. See Sound Control Ceilings Folder for STC values of various patterns	SA-905

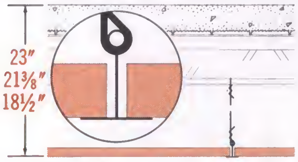
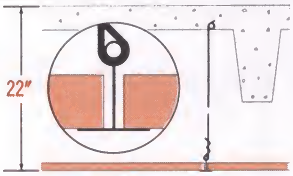
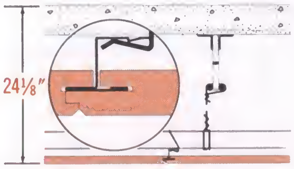
3-hour rated ceilings

MINERAL FIBER SURFACES

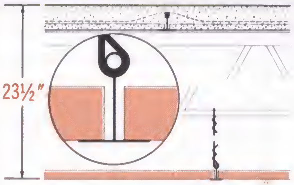
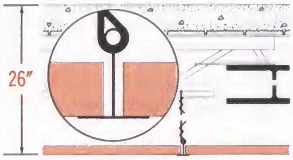
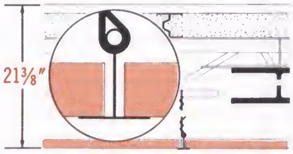
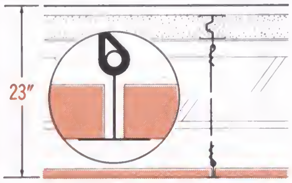
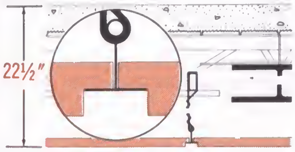
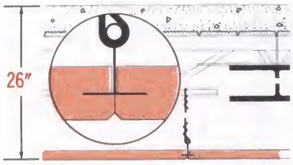
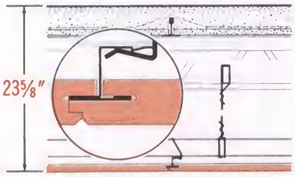
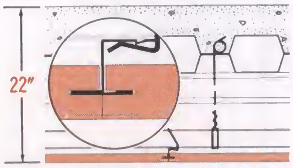
	STC rating	physical data construction detail	description & test no.	comments	folder reference
2	45 to 49	 clg wt. 1.2	AURATONE FIRECODE ⅝"x24"x24" or 24"x48" acoust clg panels in Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼" THERMAFIBER min wool bd—2¼" conc on cellular stl flr over stl beam—UL Des D207 (f)	Includes 3-hr. unrestrained beam. See Sound Control Ceilings Folder for STC values of various patterns	SA-905
3	45 to 49	 clg wt. 1.2	AURATONE FIRECODE ⅝"x24"x48" acoust clg panels in Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼" THERMAFIBER min wool bd—2½" conc on cellular stl flr—UL Des A207 (f)	Includes 4-hr. unrestrained beam. See Sound Control Ceilings Folder for STC values of various patterns	SA-905
4	45 to 49	 clg wt. 1.2	AURATONE FIRECODE ¾"x12"x12" acoust clg tile on Concealed Z-Spline Syst—clg interrupted—light fixt prot by 1¼" THERMAFIBER min wool bd—2½" conc on cellular stl flr‡—UL Des A009 (f)	Includes 4-hr. unrestrained beam. See Sound Control Ceilings Folder for STC values of various patterns	SA-905

2-hour rated ceilings

MINERAL FIBER SURFACES

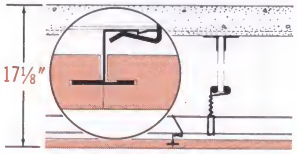
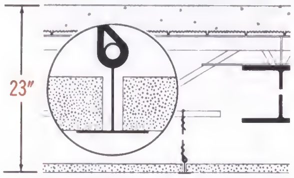
	STC rating	physical data construction detail	description & test no.	comments	folder reference
5	45 to 49	 clg wt. 1.2	AURATONE FIRECODE ⅝"x24"x48" or 24"x24" acoust clg panels in Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼" THERMAFIBER min wool bd—2½" conc deck on riblath over bar joist—UL Des G211 (f)—UL Des G227 (f)—UL Des G251 (f)	UL Des G227 is Shadow Line System and includes 4-hr. unrestrained beam. UL Des G251 includes only ⅝" x 24" x 48" panels	SA-905
6	45 to 49	 clg wt. 1.2	AURATONE FIRECODE ⅝"x24"x48" or 24"x24" acoust clg panels in Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼" THERMAFIBER min wool bd—2" prestressed conc units with 6" deep stems 48" o.c.‡—UL Des J202 (f)		SA-905
7	40 to 44	 clg wt. 1.2	AURATONE FIRECODE ⅝"x12"x12" acoust clg tile on Concealed Z-Spline Syst—clg interrupted—light fixt prot by 1¼" min wool bd—2½" conc deck on riblath over bar joist‡—UL Des G019 (f)	See Sound Control Ceilings Folder for STC values of various patterns	SA-905

‡AIRSON Air Distribution Products may be substituted.

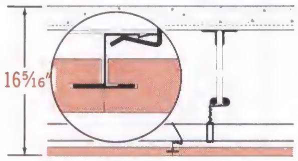
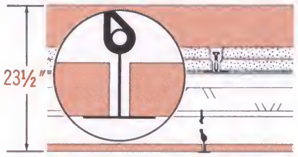
STC rating	physical data construction detail	description & test no.	comments	folder reference	
45 to 49	 clg wt. 1.2	**AURATONE FIRECODE** ⅝"x24"x48" acoust clg panels In Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼" **THERMAFIBER** min wool bd—2" **PYROFILL** gypsum conc roof deck with ½" **SHEETROCK** formbd or 1" **FIRECODE** formbd over bar joist‡—UL Des P207 (f)	See Sound Control Ceilings Folder for STC values of various patterns	SA-305 SA-905	8
45 to 49	 clg wt. 1.2	**AURATONE FIRECODE** ¾"x24"x24" to 30"x60" or 20"x60" acoust clg panels in Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼" **THERMAFIBER** min wool bd—2½" conc deck on riblath over bar joist‡—UL Des G231 (f)	Panels ⅝" thick also qualify, except in 30"x60" size. Includes 3-hr. unrestrained beam	SA-905	9
49	 clg wt. 1.2	**USG Floor Plank and AURATONE FIRECODE Ceiling Panels**—⅝"x24"x48" or 24"x24" acoust clg panels in Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼" **THERMAFIBER** min wool bd—2" **USG** gypsum flr plank welded to bar joists 48" o.c.—¾" **MASTICAL** underlayment compd over plank—UL Des G230 (f)—USG-700612 (s)	Includes 2-hr. unrestrained beam	SA-309 SA-905	10
45 to 49	 clg wt. 1.2	**AURATONE FIRECODE** ⅝"x24"x48" acoust clg panels In Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼" **THERMAFIBER** min wool bd—2" **USG** met edge gypsum plank over bar joist—UL Des P213 (f)	See Sound Control Ceilings Folder for STC values of various patterns	SA-305 SA-306 SA-905	11
35 to 39	 clg wt. 1.3	**ACOUSTONE FIRECODE** ¾"x24"x24" min acoust tile on Exp Shadow Line Grid Syst—clg interrupted—light fixt prot by 1¼" **THERMAFIBER** min wool bd—2½" conc deck on riblath over bar joist‡—UL Des G228 (f)	Includes 2-hr. unrestrained beam	SA-905	12
40 to 44	 clg wt. 1.2	**AURATONE FIRECODE** ⅝"x12"x12" to 24"x24" acoust clg tile on Concealed Accessible Grid Syst—clg interrupted—light fixt prot by 1¼" **THERMAFIBER** min wool bd—2½" conc deck on riblath over bar joist‡—UL Des G008 (f)	Includes 2-hr. unrestrained beam. See Sound Control Ceilings Folder for STC values of various patterns	SA-905	13
40 to 44	 clg wt. 1.2	**AURATONE FIRECODE** ⅝"x12"x12" acoust clg tile on Concealed Z-Spline Syst—clg interrupted—light fixt prot by 1¼" **THERMAFIBER** min wool bd—2" **THERMOFILL** gypsum conc roof deck with ½" **SHEETROCK** formbd or 1" **FIRECODE** formbd over bar joist‡—UL Des P002 (f)	See Sound Control Ceilings Folder for STC values of various patterns	SA-305 SA-905	14
40 to 44	 clg wt. 1.3	**ACOUSTONE FIRECODE** ¾"x12"x12" min acoust tile on Concealed Z-Spline Syst—clg interrupted—light fixt prot by 1¼" **THERMAFIBER** min wool bd—2½" conc deck on cellular stl flr‡—UL Des A010 (f)	Includes 1½-hr. unrestrained beam	SA-905	15

‡AIRSON Air Distribution Products may be substituted.

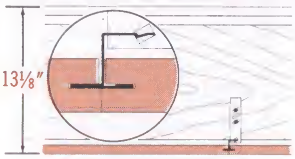
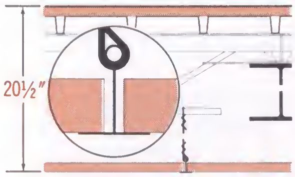
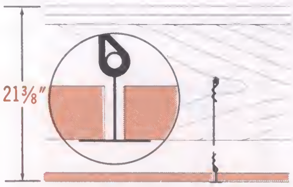
2-hour rated ceilings MINERAL FIBER SURFACES (continued)

	STC rating	physical data construction detail	description & test no.	comments	folder reference
16	40 to 44	 clg wt. 1.3	ACOUSTONE FIRECODE ¾″x12″x12″ min acoust tile on Concealed Z-Spline Syst—2½″ conc deck on riblath over bar joist—UL Des G018 (f)		SA-905
17	N/A	 clg wt. 2.0	FIRECODE ½″x24″x24″ Gypsum Panels on Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼″ THERMAFIBER min wool bd—2½″ conc deck on riblath over bar joist—UL Des G222 (f)	Includes 2-hr. unrestrained beam	SA-905

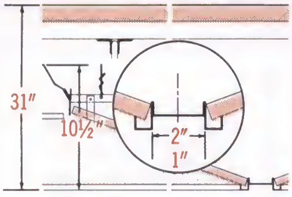
1½-hour rated ceilings MINERAL FIBER SURFACES

18	30 to 34	 clg wt. 1.3	ACOUSTONE FIRECODE ¾″x12″x12″ min acoust tile on Concealed Z-Spline Syst—2″ conc deck on riblath over bar joist—UL Des G020 (f)		SA-905
19	45 to 49	 clg wt. 1.2	AURATONE FIRECODE ⅝″x24″x48″ acoust clg panels in direct-hung Susp Exp Grid Syst—2″ SPAN-ROCK gypsum plank & 3½″ noncomb insul over bar joist—UL Des P228 (f)		SA-305 SA-905

1-hour rated ceilings MINERAL FIBER SURFACES

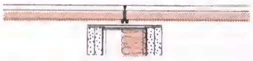
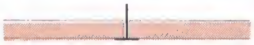
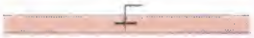
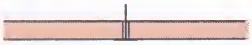
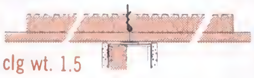
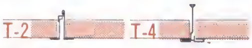
20	30 to 34	 clg wt. 1.3	ACOUSTONE FIRECODE ¾″x12″x12″ min acoust tile on Concealed Z-Spline Syst—1″ nom plywd & MASTICAL underlayment compd or wd sub & fin floor over wd joist 16″ o.c.—UL Des L003 (f)		SA-905
21	45 to 49	 clg wt. 1.2	AURATONE FIRECODE ⅝″x24″x48″ acoust clg panels in Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼″ THERMAFIBER min wool bd—1½″ stl roof deck & 1″ noncomb insul over bar joist—UL Des P214 (f)	Includes 1-hr. unrestrained beam. See Sound Control Ceilings Folder for STC values of various patterns	SA-905
22	45 to 49	 clg wt. 1.2	AURATONE FIRECODE ⅝″x24″x48″ or 24″x24″ acoust clg panels in Susp Exp Grid Syst—clg interrupted—light fixt prot by 1¼″ THERMAFIBER min wool bd—1″ nom plywd & MASTICAL underlayment compd or wd sub & fin flr over 2x10 wd joist—UL Des L206 (f)	See Sound Control Ceilings Folder for STC values of various patterns	SA-905

‡AIRSON Air Distribution Products may be substituted.

STC rating	physical data construction detail	description & test no.	comments	folder reference	
43		MOD V Ceiling System—AURATONE FIRECODE ⅝" acoust clg panels and 2'x4' light fixt on MOD Grid Syst—60"x60" module—1½" stl roof deck & 1 5/16" noncomb insul over bar joist—UL Des P222(f)—USG-237-FT-G&H (s)	Vaulted integrated environmental ceiling continuous over partition. Sound atten. test based on grid system with 2" regress	SA-907	23

noncombustible ceilings

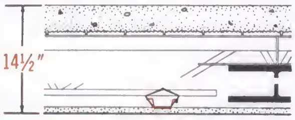
MINERAL FIBER SURFACES

STC rating	physical data construction detail	description & test no.	comments	folder reference	
40		DELTA Ceiling System—ACOUSTONE Foil-Backed Glacier ¾"x24"x24" acoust clg panels in DELTA Grid Syst—clg contin over partn—ASTM E84 (f)—USG-240-FT-G&H (s)	Sound atten. test for integrated environmental ceiling	SA-907	24
35 to 39		ACOUSTONE "F" Foil-Backed ¾"x12"x24" or 12"x36" min acoust tile on 1-Way Exp Grid Syst—ASTM E84(f)	One-way exposed grid system for accessibility	SA-905	25
40 to 44		ACOUSTONE Foil-Backed Fissured or Glacier ¾"x 12"x12" min acoust tile on concealed 100% Accessible direct hung Susp Syst—ASTM E84(f)	Basic direct-hung concealed accessible system	SA-905	26
35 to 39		ACOUSTONE "F" ¾"x12"x12" or 12"x24" min acoust tile on Concealed Z-Spline Syst‡—ASTM E84 (f)	Basic concealed spline acoustical tile system; STC estimated	SA-905	27
40 to 44		AURATONE ⅝" or ¾"x24"x24" or 24"x48" acoust clg panels in Susp Exposed Grid Syst‡—ASTM E84 (f)	Basic noncombustible lay-in panels; NRC varies with pattern	SA-905	28
44(1) 48(2)		AURATONE ⅝"x24"x48" acoust clg panels in Susp ExpGridSyst—continoverpartn—1½" THERMAFIBER sound atten blkts over clg—ASTM E84 (f)—(1) USG-210-FT-G&H (s)—(2) USG-211-FT-G&H (s)	Test USG-211-FT includes double-layer blankets extending 4' both sides of partition	SA-905	29
N/A		AIRSON Grid Air Distr Syst—Exposed AIRFLO grid systems for noncomb acoust panels—adjustable air distr through grid itself—ASTM E84 (f)	Basic steel or alum. grid with unslotted panels	SA-905	30

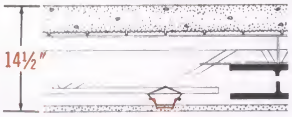
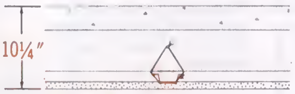
gypsum drywall and plaster ceilings

3-hour rated ceilings

PLASTERED ASSEMBLY

STC rating	physical data construction detail	description & test no.	comments	folder reference	
N/A		⅝" IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—USG met fur chan—base att with 1" Type S screws 12" o.c.—joints exp or taped—1/16" IMPERIAL plaster—3" conc on riblath over bar joist—UL Des G512 (f)	Includes 3-hr. unrestrained beam. Spacing of furring channel at 16" o.c. recommended	SA-912	31

GYPSUM DRYWALL SURFACES

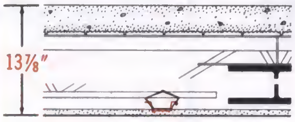
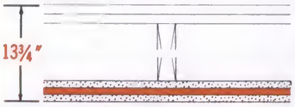
STC rating	physical data construction detail	description & test no.	comments	folder reference	
N/A		⅝" SHEETROCK FIRECODE "C" gypsum panels—USG met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c.—joints exp or fin—3" conc on riblath over bar joist—UL Des G512 (f)	Includes 3-hr. unrestrained beam	SA-923	32
N/A		⅝" SHEETROCK FIRECODE "C" gypsum panels—USG met fur chan 24" o.c.—panels att with 1" Type S screws 12" o.c. in field and 8" o.c. at ends—joints fin—prestressed conc units with 6" deep stems 48" o.c.—UL Des J502 (f)—UL Des J503 (f)—UL Des J504 (f)	Rating based on 2¾" thick reg. or 2½" lightwt. concrete slab	SA-923	33

‡AIRSON Air Distribution Products may be substituted.

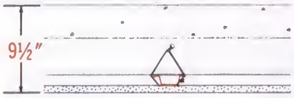
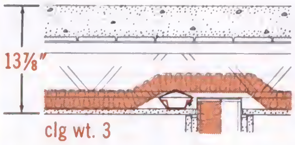
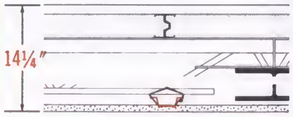
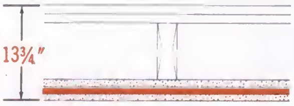
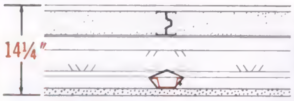
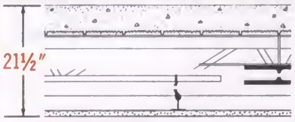
b ceilings

2-hour rated ceilings

PLASTERED ASSEMBLIES

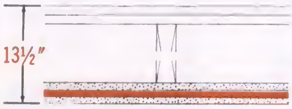
	sound rating		physical data construction detail	description & test no.	comments	folder reference
	STC	IIC				
34	N/A		 clg wt. 4	½″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling furred or susp—USG met fur chan—base att with screws 12″ o.c.—joints taped —1/16″ IMPERIAL plaster—2½″ conc on riblath or corrug stl deck over bar joist—UL Des G515 (f)	Includes 2-hr. unrestrained beam. Spacing of furring channel at 16″ o.c. recommended	SA-912
35	N/A		 clg wt. 5	Resil 2 layers ⅝″ IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—1″ nom wd sub & fin flr—2x10 wd joist 16″ o.c.—RC-1 chan screw att over base layer—face layer screw att to chan 12″ o.c.—1/16″ veneer plaster—joints taped—UL Des L511 (f)		SA-913

GYPSUM DRYWALL SURFACES

	sound rating		physical data construction detail	description & test no.	comments	folder reference
	STC	IIC				
36	N/A		 clg wt. 3	⅝″ SHEETROCK FIRECODE "C" gypsum panels—USG met fur chan 24″ o.c.—panels att with 1″ Type S screws 12″ o.c. in field and 8″ o.c. at ends—joints fin—prestressed conc units with 6″ deep stems 48″ o.c.—UL Des J502 (f)—UL Des J503 (f)	Rating based on 2″ thick reg. or lightwt. concrete slab	SA-923
37	54		 clg wt. 3	½″ SHEETROCK FIRECODE "C" gypsum panels—furred or susp—USG met fur chan 24″ o.c.—panels att with 1″ Type S screws 12″ o.c.—joints exp or fin —2½″ conc on riblath or corrug stl deck over bar joist—UL Des G515 (f)—USG-189-FT-G&H (s)	Includes 2-hr. unrestrained beam. STC based on furred interrupted clg., 1½″ sound atten. blankets extendg. 4′ beyond partn.	SA-923
38	54(1)	37(1) 64(2)	 clg wt. 3 subflr wt. 20.5	USG Floor Plank System—¾″ MASTICAL underlayment compd—(1) ⅛″ vinyl flr tile (2) 39-oz carpet & 40-oz pad—2″ USG gypsum flr plank welded to bar joists 48″ o.c.—USG met fur chan 24″ o.c. wire-tied to joists—⅝″ SHEETROCK FIRECODE "C" gypsum panels screw-att 12″ o.c.—joints fin—UL Des G516 (f) —(1) BBN-720506 (s)—(1) BBN-720507 (s)—(2) BBN-720509 (s)	Includes 2-hr. unrestrained beam	SA-309 SA-923
39	N/A		 clg wt. 5	Resil 2 layers ⅝″ SHEETROCK FIRECODE "C" gypsum panel ceiling—1″ nom wd sub & fin flr—2x10 wd joist 16″ o.c.—RC-1 chan spaced 24″ o.c. screw att over base layer panels—face layer screw att to chan 12″ o.c.—joints fin—UL Des L511 (f)		SA-924 SA-925
40	N/A		 clg wt. 3	⅝″ SHEETROCK FIRECODE "C" gypsum panels—USG met fur chan 24″ o.c.—panels att with Type S screws 12″ o.c.—joints exp or fin—2″ USG met edge gypsum plank over bar joist—UL Des P501 (f)		SA-305 SA-306
41	N/A		 clg wt. 4	½″ SHEETROCK FIRECODE "C" gypsum panels—susp grid with main run 4′ o.c. and cross tees 2′ o.c. —gypsum panels screw-att below grid—joints fin—2½″ conc on riblath over bar joist—UL Des G527 (f)	Includes 3-hr. beam rating; 4-hr. beam rating based on ⅝″ thick panels	SA-923

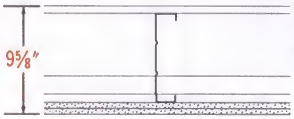
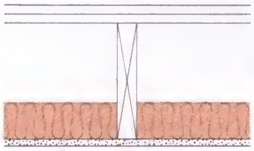
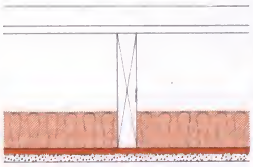
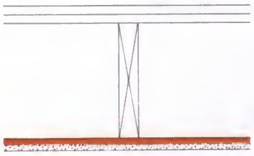
1½-hr. rated ceilings

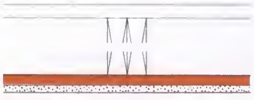
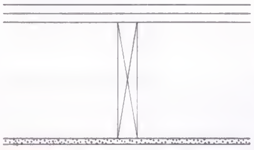
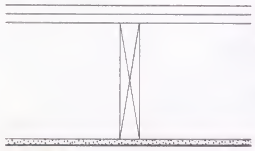
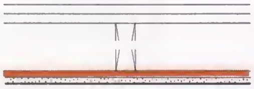
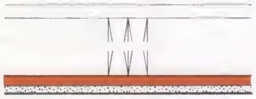
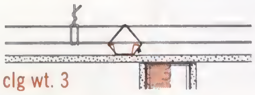
GYPSUM DRYWALL SURFACES

	sound rating		physical data construction detail	description & test no.	comments	folder reference
	STC	IIC				
42	N/A		 clg wt. 5	Resil 2 layers ½″ SHEETROCK FIRECODE "C" gypsum panel ceiling—1″ nom wd sub & fin flr—2x10 wd joist 16″ o.c.—RC-1 chan spaced 24″ o.c. screw att over base layer panels—face layer screw att to chan 12″ o.c.—joints fin—UL Des L510 (f)	Fire rating also applies with IMPERIAL Gypsum Base and veneer plaster surface	SA-924 SA-925

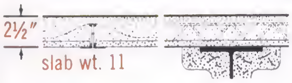
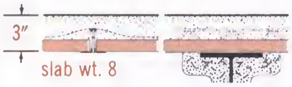
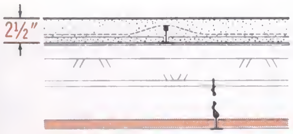
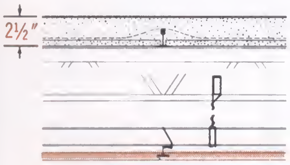
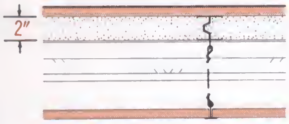
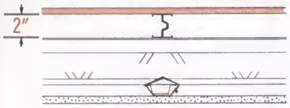
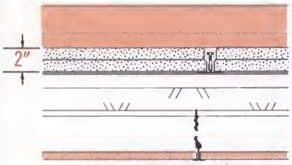
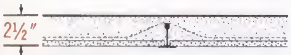
1-hour rated ceilings

GYPSUM DRYWALL SURFACES

sound rating		physical data construction detail	description & test no.	comments	folder reference	
STC	IIC					
N/A		 clg wt. 4	½" SHEETROCK FIRECODE "C" gypsum panels—USG Steel Joists 24" o.c.—dbl layer gypsum panel clg and ⅝" T&G plywd flr att to joists with Type S-12 screws—dbl layer gypsum panels around beam—joints exp—UL Des L524(f)	Includes 1-hr. unrestrained beam	SA-510 SA-923	43
41(1) 40(2)	32(1) 58(2)	 clg wt. 3	⅝" SHEETROCK gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—panels att with 6d nails 6" o.c.—joints fin—est (f)—(1) CK-6412-6 (s)—(2) CK-6412-5 (s)	Est. fire rating based on UL Des L501. In CK-6412-5 test, 44-oz. carpet & 40-oz. pad added atop flooring	SA-924	44
55(1)	52(1) 64(2)		Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—¾" PYROROCK underlayment bd over ⅝" plywd subflr—(1) ⅛" vinyl flr tile (2) 66-oz carpet & 40-oz pad—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin—(1) BBN-720503 (s)—(1) BBN-720502 (s)—(2) BBN-720501 (s)	Est. fire rating based on UL Des L514	SA-924	45
N/A		clg wt. 3	Resil ⅝" SHEETROCK FIRECODE "C" gypsum panel ceiling—1⅝" perlite-sand conc over ⅝" plywd subflr—2x10 wd joists 16" o.c.—3" glass fiber batts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin—UL Des L516 (f)		SA-924	46
56(1)	54(2)		Resil ½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom plywd & MASTICAL underlayment compd or wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan spaced 24" o.c.—panels att with 1" Type S screws—joists fin—UL Des L514 (f)—(1) BBN 670601 (s)—(2) BBN-670602 (s)	Sound ratings based on ¾" MASTICAL, ⅝" plywd subfloor and 3" insulating blankets	SA-924 SA-925	47
47(1) 47(2)	39(1) 39(2)		Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—2x10 wd joist 16" o.c.—RC-1 chan screw att to joist—panels att with 1" Type S screws—joints fin—est (f)—(1) CK-6512-6 (s)—(2) CK-6412-10(s)	Est. fire ratings based on UL Des L514. CK-6512-6 based on ½" FIRECODE "C" panels; CK-6412-10 based on ⅝" reg. panels	SA-924 SA-925	48
47(1) 48(2)	67(1) 66(2)		Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin—est (f)—(1) CK-6512-7 (s)—(2) CK-6412-9 (s)	Est. fire rating based on UL Des L514. CK-6512-7 based on ½" FIRECODE "C" panels; CK-6412-9 based on ⅝" reg. SHEETROCK panels	SA-924 SA-925	49
51(1) 50(2)	46(1) 46(2)	clg wt. 3	Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin—est(f)—(1) CK-6512-9 (s)—(2) CK-6412-3(s)	Est. fire rating based on UL Des L514. CK-6512-9 based on ½" FIRECODE "C" panels; CK-6412-3 based on ⅝" reg. SHEETROCK panels	SA-924 SA-925	50
52(2) 51(2)	71(1) 70(2)		Resil SHEETROCK gypsum panel ceiling—1¼" nom wd sub & fin flr—44-oz carpet & 40-oz pad atop flr—2x10 wd joist 16" o.c.—3" THERMAFIBER ins blkts betw joists—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin—est (f)—(1) CK-6512-8 (s)—(2) CK-6412-4 (s)	Est. fire rating based on UL Des L514. CK-6512-8 based on ½" FIRECODE "C" panels; CK-6412-4 based on ⅝" reg. panels	SA-924 SA-925	51
49(1)	45(1) 58(2)		Resil ⅝" SHEETROCK FIRECODE "C" gypsum panel ceiling—¾" PYROROCK underlayment bd over ⅝" plywd subflr—(1) ⅛" vinyl flr tile (2) 66-oz carpet & 40-oz pad—2x10 wd joist 16" o.c.—RC-1 chan screw att to joists—panels att with 1" Type S screws—joints fin—UL Des L523 (f)—(1) BBN-740307 (s)—(1) USG-740302 (s)—(2) USG-740308 (s)	Fire rating also applies with direct-attached gypsum panel ceiling. USG-740302 based on ½" thick gypsum panels	SA-924 SA-925	52

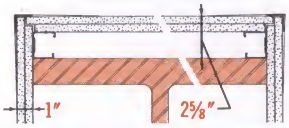
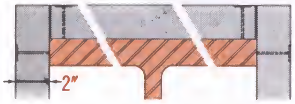
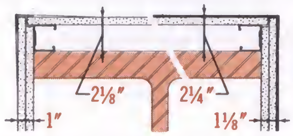
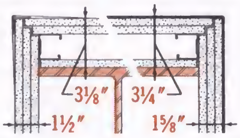
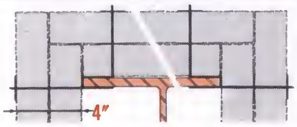
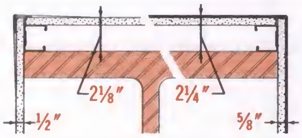
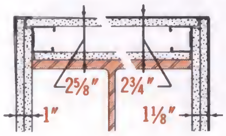
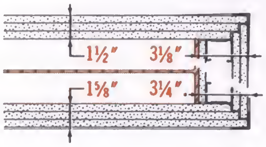
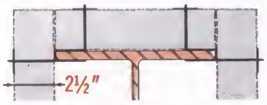
	sound rating		physical data construction detail	description & test no.	comments	folder reference
	STC	IIC				
1-hour rated ceilings				**GYPSUM DRYWALL SURFACES (continued)**		
53	N/A		 clg wt. 3	⅝" SHEETROCK FIRECODE gypsum panel ceiling—Amer Plywood Assn 2-4-1 flr 4x10 wd joist 48" o.c.—USG met fur chan spaced 24" o.c.—panels att with 1" Type S screws—joints fin—UL Des L508 (f)	Only 1-hr. residential drywall system based on 48" joist spacing	SA-924
54	48	35		½" SHEETROCK FIRECODE "C" gypsum panel ceiling—½" plywd & ¾" MASTICAL underlayment compd over subflr—2x10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin—UL Des L512 (f)—BBN-671007 & 671008 (s)	BBN-671007 & 671008 based on 1¼" thick MASTICAL floor underlayment	SA-924
55	38(1) 39(2)	32(1) 56(2)	 clg wt. 3	⅝" SHEETROCK FIRECODE gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—panels att with 6d nails 6" o.c.—joints fin—UL Des L501 (f)—(1) CK-6412-7 (s)—(2) CK-6412-8 (s)	In CK-6412-8 test, 44-oz. carpet & 40-oz. pad added atop flooring	SA-924
56	36†			½" SHEETROCK FIRECODE "C" gypsum panel ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—panels att with 5d cem ctd nails 6" o.c.—joints fin—UL Des L512 (f)—NBS-77 P-716 (s)	Basic assembly—sound attenuation test	SA-924
				PLASTERED ASSEMBLIES		
57	N/A			½" IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—wd joist 2x10 16" o.c.—1" nom wd sub & fin flr—base att with 5d nails 6" o.c.—1/16" veneer plaster—joints taped—UL Des L512 (f)	Fire rating also applies with ¾" MASTICAL underlayment compound over plywood subfloor	SA-913
58	N/A		 clg wt. 3	⅝" IMPERIAL FIRECODE gypsum base & veneer plaster ceiling—1" nom wd sub & fin flr—2x10 wd joist 16" o.c.—base att with 6d nails 6" o.c.—1/16" veneer plaster—joints taped—UL Des L501 (f)		SA-913
59	N/A		 clg wt. 3	Resil ½" IMPERIAL FIRECODE "C" gypsum base & veneer plaster ceiling—wd joist 2x10 16" o.c.—1" nom wd sub & fin flr—RC-1 chan spaced 16" o.c. and at end joints—base att with Type S screws 12" o.c.—1/16" veneer plaster—joints taped—UL Des L514 (f)	Fire rating also applies with ¾" MASTICAL underlayment compound over plywood subfloor	SA-913
60	N/A		 clg wt. 3	⅝" IMPERIAL FIRECODE gypsum base & veneer plaster ceiling—Amer Plywood Assn 2-4-1 flr 4x10 wd joist 48" o.c.—USG met fur chan—base att with 1" Type S screws—1/16" veneer plaster—joints taped—UL Des L508(f)	Only 1-hr. residential veneer plaster system based on 48" joist spacing	SA-913
noncombustible ceilings				**GYPSUM DRYWALL SURFACES**		
61	45		 clg wt. 3	⅝" SHEETROCK FIRECODE gypsum panels—1½" cr chan 4' o.c.—USG met fur chan 24" o.c.—panels screw att 12" o.c.—joints fin—ASTM E84 (f)—USG-5-FT-G&H (s)	"Up and over" attenuation—suspension & ceiling membrane only	SA-923

†*Based on 11-freq. (See "Roof Assemblies" section, right, for ceilings of finished formboards available as part of integral roof system. Also see U.S.G. Technical Bulletin CS-6 Metal-Framed Metal Lath and Plaster Systems, for other fire-tested ceiling assemblies. Refer to U.S.G. Technical Folder SA-707 THERMAFIBER Fire Safety Systems, for safing insulation used with these systems.)*

fire rating	physical data construction detail	description & test no.	comments	folder reference	
2 hrs. (beam 2 hrs.)	 slab wt. 11	PYROFILL Gypsum Concrete Roof Deck poured 2″ min thickn over ½″ SHEETROCK or 1″ FIRECODE formbd—Keydeck truss tee—Keydeck reinf mesh —UL Des P676 (f)	Protection of primary steel required. Fire rating based on 8′ max. beam spacing	SA-305	1
2 hrs. (beam 2 hrs.)	 slab wt. 8	THERMOFILL Gypsum Concrete Roof Deck poured 2″ min thickn over 1″ to 1½″ FIRECODE formbd —Keydeck truss tee—Keydeck reinf mesh—UL Des P677 (f)	Protection of primary steel required. Fire rating based on 7′ max. beam spacing	SA-305	2
2 hrs.	 slab wt. 11	PYROFILL Gypsum Concrete Roof Deck poured 2″ min thickn over ½″ SHEETROCK or 1″ FIRECODE formbd—bulb tee on 12″ bar joist—susp AURATONE FIRECODE or AIRSON AURATONE FIRECODE acoust clg panels—UL Des P207 (f)	AIRSON Ceiling includes air control valves in panels. Fire rating based on 4′ max. joist spacing. Rating also applies with ½″ SHEETROCK Formboard on USG sub-purlin	SA-305 SA-905	3
2 hrs.	 slab wt. 8.2	THERMOFILL Gypsum Concrete Roof Deck poured 2″ min thickn over ½″ SHEETROCK or 1″ FIRECODE formbd—bulb tee on 10″ bar joist—susp AURATONE FIRECODE or AIRSON AURATONE FIRECODE acoust clg tile—UL Des P002 (f)	AIRSON Ceiling includes air control valves in tile. Fire rating based on 4′ max. joist spacing. Rating also applies with ½″ SHEETROCK Formboard on USG sub-purlin	SA-305 SA-905	4
2 hrs.	 plank wt. 13	USG Metal Edge Plank Roof Deck—precast gypsum plank clipped or welded to bar joists spaced 7′0″ o.c. —¾″ noncomb insul—⅝″ AURATONE FIRECODE susp acoust clg panels—UL Des P213 (f)	A good high-strength, long-span dry decking simple to erect	SA-305 SA-306 SA-905	5
2 hrs.	 plank wt. 13	USG Metal Edge Plank Roof Deck—precast gypsum plank clipped or welded to bar joists spaced 4′0″ o.c. —¾″ noncomb insul—USG met fur chan 24″ o.c.— ⅝″ SHEETROCK FIRECODE "C" gypsum panels screw att 12″ o.c.—joints exp or fin—UL Des P501 (f)		SA-305 SA-306	6
1½ hrs.	 plank wt. 8.4	USG SPAN-ROCK Gypsum Plank Deck—plank grouted in place on truss tees 24″ o.c.—tees welded to bar joists 7′0″ o.c.—3½″ noncomb insul—susp ⅝″ AURATONE FIRECODE acoust clg panels—UL Des P228 (f)		SA-305 SA-905	7
noncomb.	 slab wt. 11	PYROFILL or THERMOFILL Gypsum Concrete poured over noncomb formbd—rated noncombustible by NBFU definition—SS-S-118a fed spec	Thickness of fill 2″ min.	SA-305	8

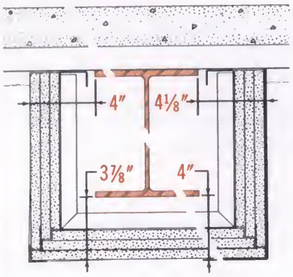
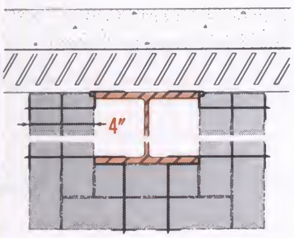
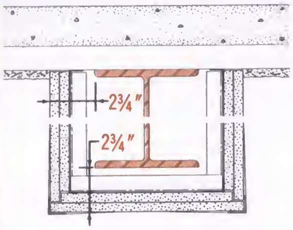
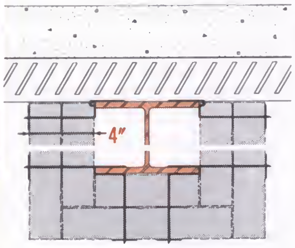
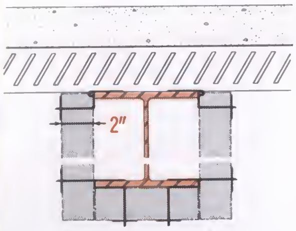
d structural fireproofing

column fireproofing

	column type	physical data construction detail	description & test no.	comments	folder reference
			4-HOUR RATED APPLICATIONS		
1	W14 x228		Gypsum Drywall or Veneer Plaster Fireprfg—2 layers ½″ SHEETROCK FIRECODE "C" panels or ½″ IMPERIAL FIRECODE "C" gypsum base around col—panels screw att to 158ST5 stl studs at corners—met corner beads—joints fin or 1/16″ IMPERIAL plaster over base—UL Des X507 (f)		SA-923
2	W14 x228		THERMAFIBER Mineral Fireprfg—2″ fireprfg around col att with ⅛″ stl wire studs welded to col 24″ o.c. —UL Des X202 (f)—UL Des X304 (f)	Dry assembly; offers excellent thermal insulation for exterior columns	SA-707
			3-HOUR RATED APPLICATIONS		
3	W14 x228		Gypsum Drywall or Veneer Plaster Fireprfg—½″ SHEETROCK FIRECODE "C" panels or ½″ IMPERIAL FIRECODE "C" gypsum base around col—double layer over ea web face—panels screw att to 158ST5 stl studs at col corners—met corner beads—joints fin or 1/16″ IMPERIAL plaster over base—UL Des X514 (f)		SA-923
4	W10 x49		Gypsum Drywall or Veneer Plaster Fireprfg—3 layers ½″ SHEETROCK FIRECODE "C" panels or ½″ IMPERIAL FIRECODE "C" gypsum base around col—triple layer over ea flange end—inner layers on flange face separ by 158ST5 stl studs & screw att—met beads on corners—joints fin or 1/16″ IMPERIAL plaster over base—UL Des X515 (f)		SA-923
5	W10 x49		THERMAFIBER Mineral Fireprfg—dbl layer 2″ fireprfg around col att with flange clips & clinch shields 16″ o.c.—UL Des X306 (f)	Dry assembly; offers excellent insulation for exterior columns	SA-707
			2-HOUR RATED APPLICATIONS		
6	W14 x228		Gypsum Drywall or Veneer Plaster Fireprfg—½″ SHEETROCK FIRECODE "C" panels or ½″ IMPERIAL FIRECODE "C" gypsum base around col—panels screw att to 158ST5 stl studs at col corners—met corner beads—joints fin or 1/16″ IMPERIAL plaster over base—UL Des X521 (f)		SA-923
7	W10 x49		Gypsum Drywall or Veneer Plaster Fireprfg—½″ SHEETROCK FIRECODE "C" panels or ½″ IMPERIAL FIRECODE "C" gypsum base around col—double layer over ea flange end—double layer on flange faces separ by 158ST5 stl studs & screw att—met beads on corners—joints fin or 1/16″ IMPERIAL plaster over base—UL Des X518 (f)		SA-923
8	Varies		Gypsum Drywall or Veneer Plaster Fireprfg—3 layers ½″ SHEETROCK FIRECODE "C" panels or ½″ IMPERIAL FIRECODE "C" gypsum base around col—triple layer over ea flange end—inner layers on flange face separ by 158ST5 stl studs & screw att—met beads on corners—joints fin or 1/16″ IMPERIAL plaster over base—UL Des X524 (f)	Rating applies to tapered or constant section prefabricated metal building columns	SA-923
9	W10 x49		THERMAFIBER Mineral Fireprfg—2½″ fireprfg around col att with flange clips & clinch shields 24″ o.c.—UL Des X305 (f)	Dry assembly; offers excellent thermal insulation for exterior columns	SA-707

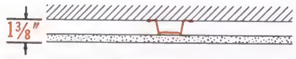
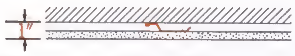
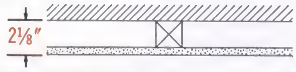
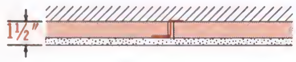
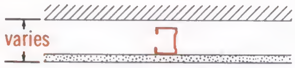
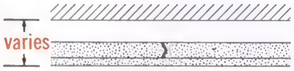
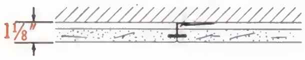
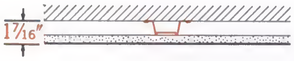
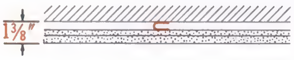
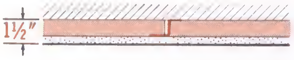
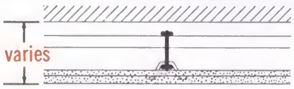
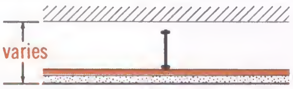
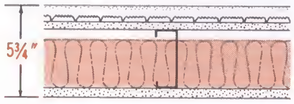
(For other tested fireproofing assemblies, see U.S.G. Technical Bulletins: CS-6 Metal-Framed Metal Lath and Plaster Systems; PM-150 Gypsum Lath Column Fireproofing.)

beam fireproofing

fire rating	beam type	physical data construction detail	description & test no.	comments	folder reference	
3 hrs. (beam only)	W8 X24		Gypsum Drywall or Veneer Plaster Caged Beam Fireprfg—158CR5 USG stl run chan brackets 24" o.c.—⅞" x 1⅜" corner angles att to brackets—3 layers ⅝" SHEETROCK FIRECODE gypsum panels or IMPERIAL FIRECODE gypsum base att with Type S screws—1" 20-ga. hex mesh on bottom over middle layer—met beads on corners—joints fin or 1/16" IMPERIAL plaster over base—2½" conc deck on fluted stl flr—UL Des N505 (f)	Extends drywall and veneer plaster use to beam protection. Fire rating for restrained assembly; 2-hr. rating for unrestrained assembly	SA-912 SA-923	10
3 hrs.	W8 X24		THERMAFIBER Mineral Fireprfg—dbl layer 2" fireprfg around beam att with flange clips & clinch shields 12" o.c.—2½" conc deck on cellular stl flr—UL Des N304 (f)	Fire rating for restrained beam; unrestrained beam rating is 2 hrs.	SA-707	11
2 hrs. (beam only)	W8 X24		Gypsum Drywall Caged Beam Fireprfg—158CR5 USG stl run chan brackets 24" o.c.—1⅜"x⅞" corner angles att to chan brackets—dbl layer ⅝" SHEETROCK FIRECODE gypsum panels att with Type S screws—met beads on corners—joints fin—2½" conc deck on fluted stl flr—UL Des N501 (f)—UL Des N502 (f)	Design N502 based on 1⅝" steel runner for corner angles & coped brackets	SA-923	12
2 hrs.	W8 X13		THERMAFIBER Mineral Fireprfg—dbl layer 2" fireprfg around beam att with flange clips & clinch shields 16" o.c.—3¼" conc on fluted steel flr—UL Des D915 (f)	Fire rating is 1½ hrs. with cellular steel floor units	SA-707	13
2 hrs.	W8 X24		THERMAFIBER Mineral Fireprfg—2" fireprfg around beam att with flange clips & clinch shields 12" o.c.—2½" conc on fluted stl flr—UL Des N304 (f)—UL Des N305 (f)	Fire rating is 1½ hrs. with cellular steel floor units	SA-707	14

(See other System Folders Nos. SA-309; SA-905, SA-912, SA-923 and U.S.G. Technical Bulletin CS-6 for protection of beams, girders, and trusses by ceiling constructions.)

e exterior walls & furring

	physical data construction detail	description & test no.	comments	folder reference
		DRYWALL ASSEMBLIES		
1		USG Metal Furring Channels 24" o.c., ½" Foil-Back SHEETROCK Panels screw attached, U.S.G. Joint Treatment	Direct attachment by furring does not isolate surface from structural stresses. No limiting height	SA-923
2		RC-1 Furring Channels 24" o.c., ½" Foil-Back SHEETROCK Panels screw attached, U.S.G. Joint Treatment	RC-1 channel reduces transfer of structural stresses to surface membrane	SA-924
3		Wood furring strips 16" o.c., ½" Foil-Back SHEETROCK Panels, U.S.G. Joint Treatment	Surface not isolated from structural stresses; good vapor barrier	SA-924
4		1" THERMAFIBER Z-Furring Insulation, USG Z-Furring Channels appl vert 24" o.c., ½" SHEETROCK gypsum panels screw attached to channels, U.S.G. Joint Treatment	Noncombustible system with mineral fiber insulation; suitable for up to 3" thick insulation	SA-923
5		USG Steel Studs 24" o.c., ½" Foil-Back SHEETROCK Panels screw attached, U.S.G. Joint Treatment	Free standing; allows for pipe chase clearance; good vapor barrier	SA-923
6		1" USG Gypsum Coreboard set in metal angle floor and ceiling runners, ½" SHEETROCK gypsum panels laminated to coreboard, U.S.G. Joint Treatment	Free standing; allows for pipe chase clearance; minimizes shadowing and spotting	SA-923
7		USG ¾" Z-splines appl vert 24" o.c., kerfed ULTRAWALL Gypsum Panels engage concealed spline	Provides exterior wall surfacing having same appearance as movable partitions	SA-1020
		PLASTERED ASSEMBLIES		
8		USG Metal Furring Channels 16" o.c., ½" Foil-Back IMPERIAL gypsum base screw attached, 1/16" IMPERIAL plaster finish	May be attached direct or additionally furred out on ¾" horiz. cold-rolled channels; good vapor barrier	SA-912
9		R-5 Resilient Clips 16" o.c., Foil-Back ROCKLATH plaster base and BRIDJOINT Clips, ½" sanded basecoat, lime putty finish	Resiliency of the R-5 Clip will reduce the transfer of structural stresses to surface membrane	SA-917
10		1" THERMAFIBER Z-Furring Insulation, USG Z-Furring Channels appl vert 24" o.c., ½" IMPERIAL gypsum base screw attached to channels, 1/16" IMPERIAL plaster finish	Noncombustible system with mineral fiber insulation; suitable for up to 3" thick insulation	SA-912
11		TRUSSTEEL Studs 16" o.c. cross braced 4' o.c. on back chord, ⅜" Foil-Back ROCKLATH plaster base attached with TL-1 Clips, ½" sanded basecoat plaster, 1/16" lime putty finish	Free standing; allows for pipe chase clearance; good vapor barrier	SA-915
12		TRUSSTEEL Studs 24" o.c., RC-1 chan spaced 16" o.c. attached with ¾" Type T screws, Foil-Back IMPERIAL gypsum base attached with 1" Type S screws, 1/16" IMPERIAL plaster finish	Free standing; allows for pipe chase clearance; good vapor barrier	SA-915
		OTHER ASSEMBLIES		
13		USG Exterior Curtain Wall—358ST10 steel studs 16" o.c.—½" gypsum sheathing—self-furring metal lath—1" cement-lime stucco exterior—3" THERMAFIBER metal stud blankets between studs—⅝" Foil-Back SHEETROCK FIRECODE "C" gypsum panels or IMPERIAL FIRECODE "C" gypsum base and 1/16" IMPERIAL plaster interior—T-4851-OSU (f)	Assembly described offers 2-hour fire resistance. Systems offer wide selection of exterior and interior surfaces, utilizing conventional materials (1)	SA-805
14		THERMAFIBER Curtain Wall Insulation	Excellent insulation; good vapor barrier. Products offer fire protection up to 5 hours for aluminum spandrel facings	SA-707

(1) For data on truss-type framing used with these systems, see U.S.G. Technical Bulletin PM-149 on "TRUSSTEEL Stud Curtain Wall Systems."

title	folder reference
Plasters, Bases & Accessories Gypsum and metal lath; corner and casing beads metal and plastic trim, control joints, clips, runners, steel studs, furring channels, brackets; base-coat, finish coat, high-strength veneer, gauging plasters; finishing limes; general lathing and plastering specs.	SA-917
Gypsum Panels & Accessories Gypsum panels, coreboard; corner beads, metal and plastic trim, steel studs, channel, runners, brackets, control joint; screws and adhesives; reinforcing tape and joint compounds; erection specs for board and joint treatment.	SA-927
TEXTONE Gypsum Panels Predecorated vinyl-faced gypsum panels and mouldings; application specs.	SA-928
Sound Control Ceilings Mineral tile and panels; air distribution system components; acoustical space units; gypsum & asbestos ceiling board; sound absorbers; installation specs.	SA-905
CDI Environmental Ceilings Mineral tile and panels for coffered, vaulted and flat ceilings with integrated lighting and air distribution components; technical data.	SA-907
Insulation Products Insulating and sound attenuation blankets; flame-resistant and noncombustible blankets; thermal resistance values, application specs.	SA-705
Paint Products Interior flats, enamels; exterior and floor paints; masonry coatings; stains, varnishes; texture finishes; sealers, primers, undercoat, block filler; metal coatings; industrial finishes; preparation and application specs.	SA-933

title	folder reference
KEWANEE Steel Doors & Frames Standard and labeled steel doors, one- and three-piece frames, custom-fabricated stick systems, details and specs.	KMD-S
ACCURATE Toilet Compartments Metal toilet compartments, urinal and entrance screens, shower cabinets, dressing enclosures, accessories, details and specs.	SA-1070
GRATE-X Gratings Expanded metal grating for platforms and walkways; stair treads; load data; details and installation specs.	SA-505
GRIP STRUT Gratings Reticulated metal grating for platforms and walkways; stair treads; load data and installation specs.	SA-506
Light-Gauge Framing Steel studs, joists, accessories for load-bearing construction; load data; details and specs.	SA-510
GLOBE-STRUT Channel Framing Metal channel supports for mechanical and electrical installations; surface raceways; concrete inserts; specs.	SA-1510
GLOBETRAY Cable Trays Rigid metal cable supports in ladder, trough and solid-bottom types; fittings and accessories; load data and installation specs.	SA-1610

U.S.G. products / specification standards

The listings below contain existing Standard Specifications, classified as Federal, Army, Navy, Treasury, etc., which apply to U.S.G. materials. Where ASTM, local codes, etc. require product variance, consult your U.S.G. representative. The symbol "WC" after a product listing denotes that U.S.G. is on the government list of those companies willing to certify that their products meet that specification. See pertinent U.S.G. Product Catalog for additional information.

PRODUCT	FEDERAL SPECIFICATION	ASTM DESIGNATION
PLASTER		
RED TOP* gypsum plaster (WC)	SS-P-00402B type II class 1 & 2	C28—gypsum neat plaster
RED TOP two-purpose plaster	SS-P-00402B type II class 1 & 2	C28—gypsum neat plaster
RED TOP wood fiber plaster (WC)	SS-P-00402B type III	C28—gypsum wood fiber
STRUCTO-LITE* plaster perlite aggregate	SS-P-00402B type I non-applicable	C28—gypsum ready mix plaster C35
RED TOP gauging plaster (WC)	SS-P-00402B type V	C28—gypsum gauging for finish coat
RED TOP keenes cement regular (WC) quick trowel	 SS-C-161A type I SS-C-161A type II	 C61 C61
STRUCTO-GAUGE* plaster	SS-P-00402B type V with added req. of dry compressive strength not less than 5000 psi (neat)	C28—gypsum gauging for finish coat
STRUCTO-BASE* plaster	SS-P-00402B type II class 1 & 2 with added req. of dry compressive strength not less than 2800 psi.	C28—gypsum neat plaster
IMPERIAL* plaster	SS-P-00402 type VI	C-587—gypsum veneer plaster
GYPSUM LATHING		
ROCKLATH* plaster base—⅜" & ½"	SS-L-30D type I, grades R and X, class 1, forms (a) and (c), style 5	C37
IMPERIAL gypsum base—½" & ⅝"	SS-L-30D type VI, grades R and X, class 1, style 1	C588
USG® R.H. base—½" & ⅝"	SS-L-30D type VI grades R and X class 1 style 1	C588

PRODUCT	FEDERAL SPECIFICATION	ASTM DESIGNATION
LIME		
RED TOP and GRAND PRIZE* finish limes	SS-L-351B type F (including added requirement of not more than 8% unhydrated oxides)	C6 type N
IVORY* finish lime		C206 type S
RED TOP masons hydrate	SS-L-351B type M (including added requirement of not more than 8% unhydrated oxides)	C207 type N
MORTASEAL* masons lime BONDCRETE* masons lime		C207 type S
METAL LATHING		
Bases, metal: (for) plaster, lath and stucco constr. (WC) 3.4# galv. diamond mesh lath, 2.5# and 3.4# c.a. ptd. & poly-backed; ⅛" 4-mesh z-riblath 2.75# and 3.4#; ⅜" riblath 3.4# and 4.0#	QQ-L-101C class 3 (flat dia. mesh) class 3 (self furring dia. mesh) class 4 (⅛" flat rib) class 1 (⅜" rib)	non-applicable
Hanger wire—tie wire	QQ-W-461g finish 5 class 1 (1006 type steel)	
GYPSUM PANELS		
SHEETROCK* (plain) (foil-back)	SS-L-30D	C36
SHEETROCK sq. edge (WC)	type III grade R class 1	C36
SHEETROCK tap. edge (WC)	type III grade R class 1	C36
SHEETROCK bev. edge (WC)	type III grade R class 1	C36
⅝" SHEETROCK FIRECODE*	type III grade X class 1	C36
SHEETROCK FIRECODE "C"	type III grade X class 1	C36
TEXTONE vinyl-covered	type III grade R or X cl. 3	C36
SHEETROCK W/R water-resist.	type VII grade W or X class 2	C630
USG Coreboard	Type IV grade R or X class 1	C442
USG Liner Panels		

*Reg. U.S. Pat. & Tm. Off.

(continued)

U.S.G. products / specification standards (continued)

SHEATHING

PRODUCT	FEDERAL SPECIFICATION	ASTM DESIGNATION
USG gypsum sheathing	SS-L-30D type II grade W cl. 2	C79

JOINT TREATMENT

PRODUCT	FEDERAL SPECIFICATION	ASTM DESIGNATION
USG & DURABOND* joint compounds	SS-J-570a type I	C474 & C475
PERF-A-TAPE* reinf. tape	SS-J-570a type II	

DRYWALL ACCESSORIES

PRODUCT	FEDERAL SPECIFICATION	ASTM DESIGNATION
USG electro-galv. studs and runners, furring channels, RC-1 resilient channels	QQS-698	C645 (except resilient channels)
USG hot-dip galv. studs, runners, furring channels, RC-1 resilient channels	QQS-775D type I class d	A525 C645 (except resilient channels)
Metal corner beads and trim	QQS-775D class e	A525
USG brand screws	—	C646
DURABOND Adhesives 200, 300, Multi-Purpose	—	C557

ACOUSTICAL UNITS—PREFABRICATED

PRODUCT	FEDERAL SPECIFICATION	ASTM DESIGNATION
ACOUSTONE* "F" MOTIF'D* ACOUSTONE AIRSON* ACOUSTONE AURATONE*	SS-S-118a (GSA-FSS) type III class 25	E84

METAL GRATING

PRODUCT	FEDERAL SPECIFICATION	ASTM DESIGNATION
GRATE-X grating	MIL-G-18015s, MIL-M-17194c & RR-G-1602	non-applicable
GRIP STRUT grating selected styles	RR-G-1602 & MIL-G-18015s	non-applicable

MINERAL FIBER INSULATION

PRODUCT	FEDERAL SPECIFICATION	ASTM DESIGNATION
THERMAFIBER*		
open face batt (membrane facing one side)	HH-I-521E type II, III	C665
blanket batt (with enveloping membranes)	HH-I-521E type II, III	C665
blowing wool	HH-I-1030a type I cl. A	none
pouring wool	HH-I-1030a type II cl. A	none
sound attenuation blanket	HH-I-521E type I	C665
THERMAFIBER safing insulation, curtain wall insulation, mineral felt fireproofing	HH-I-521E type I HH-I-558B Form A, classes 1 & 2	C665

GYPSUM ROOF DECKS

PRODUCT	FEDERAL SPECIFICATION	ASTM DESIGNATION	OTHER NATIONAL
PYROFILL* & THERMOFILL* gypsum concrete	(C.E. 219)	C317 material	ANSI A59-1
SHEETROCK formboards	SS-L-30D type V	C318 material	—
USG min. fiber formboards	SS-S-118a cl. 25	—	—
USG ¼″ asbestos formboard sheets, flat	SS-B-755a type u only	—	—
USG 2″ metal edge gypsum plank—precast	SS-T-315B type I	C377 type 2	—

*Reg. U.S. Pat. & Tm. Off.

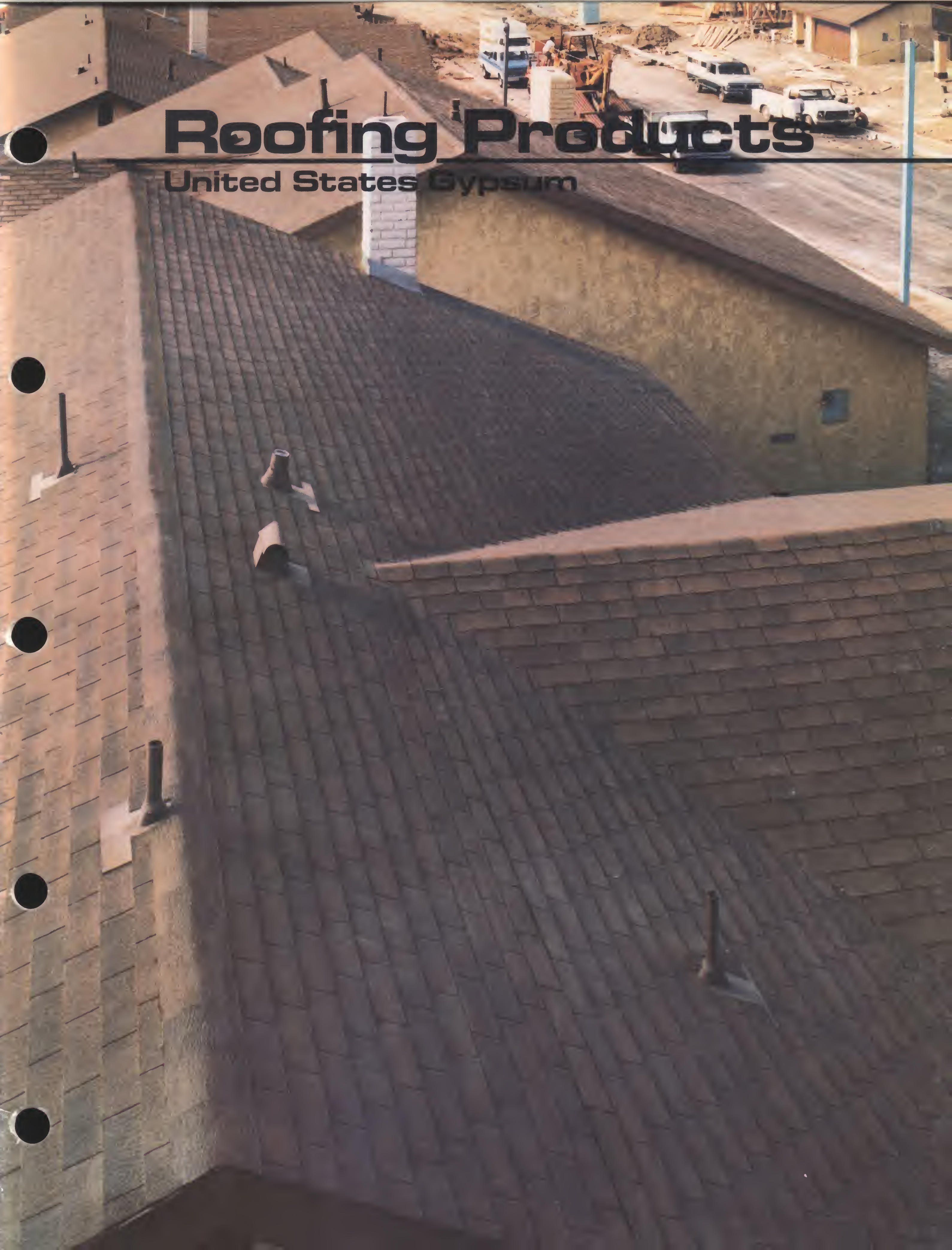
NOTE: All products described here may not be available in all geographic markets. Consult your local U.S.G. sales office or representative for information.

U.S.G. SALES OFFICES: **ALABAMA:** Birmingham, 942-7970 • **ARIZONA:** Phoenix, 269-5665 • **CALIFORNIA:** Fremont, 792-4400; Los Angeles, 388-1171; Orange, 547-7403 • **COLORADO:** Denver, 744-7008 • **FLORIDA:** Jacksonville, 396-1628; No. Miami Beach, 949-3436 • **GEORGIA:** Atlanta, 393-0770 • **HAWAII:** Honolulu, 538-7712 • **ILLINOIS:** Chicago, 321-4100 • **INDIANA:** Indianapolis, 257-9171 • **KANSAS:** Overland Park, 341-6600 • **KENTUCKY:** Louisville, 897-2529 • **LOUISIANA:** New Orleans, 241-2020 • **MARYLAND:** Baltimore, 355-2200 • **MASSACHUSETTS:** Littleton, 486-8917 • **MICHIGAN:** Southfield, 569-1900; Grand Rapids, 459-4477 • **MINNESOTA:** Minneapolis, 835-4626 • **MISSOURI:** St. Louis, 872-9172 • **NEBRASKA:** Omaha, 333-5204 • **NEW JERSEY:** Kearny, 997-1600 • **NEW YORK:** Tarrytown, 332-0800 • **NORTH CAROLINA:** Charlotte, 332-5023 • **OHIO:** Cincinnati, 771-3215; Chesterland, 729-1957; Columbus, 451-7710 • **PENNSYLVANIA:** Philadelphia, 724-4552; Pittsburgh, 341-0364 • **TENNESSEE:** Nashville, 254-0622 • **TEXAS:** Dallas, 357-6271; Bellaire, 666-0751; San Antonio, 342-5249 • **UTAH:** Salt Lake City, 359-3751 • **VIRGINIA:** Norfolk, 461-1332; Richmond, 285-7528 • **WASHINGTON:** Bellevue, 455-2595 • **WISCONSIN:** Milwaukee, 355-5850.

UNITED STATES GYPSUM
BUILDING AMERICA
General Offices: 101 South Wacker Drive, Chicago, Illinois 60606
SA-100/USG/1-77

Roofing Products

United States Gypsum



U.S.G. Roofing

Lasting protection and rich beauty

Providing reliable roofing protection for homes and other structures is a specialty of United States Gypsum. Since 1933, U.S.G. has been a leading manufacturer of high-quality roofing products.

Along with rugged, dependable protection, fire-resistant U.S.G. Roofing offers other important features—appealing beauty plus long-lasting durability with minimum maintenance. Finally, U.S.G. Roofing offers a generous range of color and design, frequently revised to meet changing market needs.

Value and dependability are built into U.S.G. Roofing products through unique quality control standards. U.S.G. Asphalt Shingles are uniformly thick with top-grade felt asphalt-saturated to resist aging. Colorfast granules are embedded in a heavy-bodied asphalt coating to form a weather-protective shield. A second coating covers the back of the shingle—all carefully controlled to conform with rigid specifications.

These manufacturing safeguards are backed by regular testing and constant product improvement at the U.S.G. Research facilities. At U.S.G., quality is built in to assure lasting satisfaction to you and your customers.

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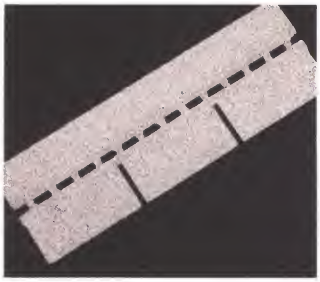
Asphalt Shingle Products

Strip Shingles—New Construction



FORTIFIED SEALCO Self-Sealing Shingles

One of the finest custom shingles ever made for institutional and public buildings as well as fine homes, FORTIFIED SEALCO Shingles are almost 30% heavier than standard strip shingles. Heavy felt provides a strong, durable base. Specially compounded asphalt deeply penetrates the felt base to provide waterproofing that adds years to shingle life. An extra-thick asphalt coating forms a shield that resists weather and wear. Giant-size, ceramic-coated mineral granules in solids, blends or earthtone colors provide lasting protection and beauty. To insure the maximum in wind protection, twelve spots of high-strength adhesive are placed across each shingle. At normal temperatures, this adhesive bonds tabs to the previous course to virtually eliminate rip-offs that occur at times with non-seal shingles. A 25-year weather limited warranty and a 5-year wind limited warranty prove the durability of this outstanding roof covering.

Specifications

Weight: approx. 300 lb. per sq. (136 kg)
Size: 12" x 36" (305 mm x 915 mm)
Exposure: 5" (127 mm); headlap 2" (51 mm)
Shingles per sq.: 80 (one sq. = 9.29 m^2)
Bundles per sq.: 4
Nails req. per sq.: 320
Underwriters Label: Class C and Wind-Resistant

SEALCO Self-Sealing Shingles

Wherever the requirement is for maximum wind protection or for application to low-pitched roofs, SEALCO self-sealing shingles by U.S.G. offer many advantages over ordinary shingles. SEALCO shingles come with 12 spots of high-strength adhesive placed across each shingle, automatically bonding the tabs to the nailed-down portion of the previous course.

This self-sealing action takes place at normal roof temperatures, not limited to extremes of summer heat. Once sealed, it protects against strong winds and driving rain. SEALCO shingles carry the U.L. Wind-Resistant label, a 15-year limited weather and 5-year wind limited warranty.

A protective tape imbedded in the underside of each shingle preserves the adhesive, prevents pre-sealing, and permits standard packaging for application direct from the bundle. The placement of SEALCO sealant spots at intervals across the shingle helps the roof to breathe, and prevents trapping of condensation beneath the tabs. Unlike ordinary shingles, no hand sealing is needed on the lower pitches down to 2/12.

Rugged, fire-resistant SEALCO shingles are available in a wide range of beautiful solid and blended colors to harmonize with the color scheme of any home.

Specifications

Weight: approx. 235 lb. (107 kg) per sq.
Size: 12" x 36" (305 mm x 915 mm)
Exposure: 5" (127 mm); headlap 2" (51 mm)
Shingles per sq.: 80 (one sq. = 9.29 m^2)
Bundles per sq.: 3
Nails req. per sq.: 320
Underwriters Label: Class C and Wind-Resistant

USG Hip and Ridge Shingles—Standard and FORTIFIED

Used for hips and ridges on asphalt-shingle jobs. Manufactured from same quality materials as SEALCO and FORTIFIED Shingles. Colors to match both. Special colors on request.

Specifications

Weight: approx. 75 lb. (34 kg) per bundle
Size: 9″ x 12″ (229 mm x 305 mm)
Shingles per bundle: 120—Standard; 84—FORTIFIED
Coverage: Standard—50 lin. ft. (15240 mm) per bundle, FORTIFIED—35 lin. ft. (10670 mm) per bundle—at 5″ exposure (126 mm) for both

Individual Shingles—Recover

USG Dutch Lap Shingles

Square design enhances roof appearance. The shingle is secured at all corners, giving extra protection against wind and weather. Smooth or textured surface.

Specifications:

Weight: approx. 150 lb. (68 kg) per sq.
Size: 12″ x 18″ (305 mm x 457 mm)
Exposure: 10″ (254 mm); headlap 2″ (51 mm)
Shingles per sq.: 96 (one sq. = 9.29 m^2)
Bundles per sq.: 2
Underwriters Class C Label

NOBILITY Dutch Lap Shingles

Distinctive appearance of the square-cut design with shadow-etched pattern lends individuality and quiet dignity to any home. Weather-resisting, durable ingredients provide long-lasting roof protection. Textured surface. Choice of attractive colors. Fifteen-year limited warranty on material; no wind warranty.

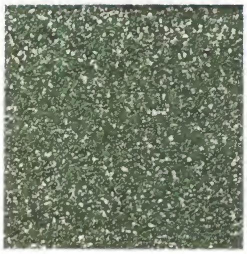
Specifications

Weight: approx. 175 lb. (79 kg) per sq.
Size: 12″ x 18″ (305 mm x 457 mm)
Exposure: 10″ (254 mm); headlap 2″ (51 mm)
Shingles per sq.: 96 (one sq. = 9.29 m^2)
Bundles per sq.: 2
Underwriters Class C Label

Asphalt Shingle Colors

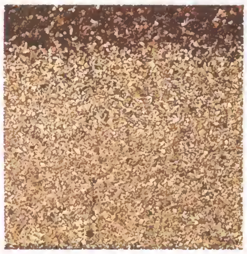
Attractive Colors for Roofing Beauty

SEALCO Self-Sealing Shingles

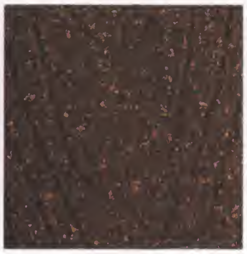

Rainier Green

Regal White

Slate Black

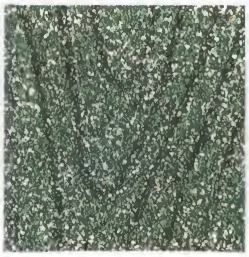

Cedartone

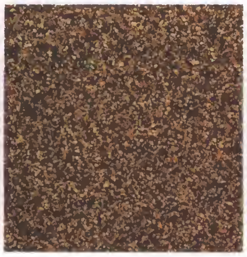
Brilliant Green

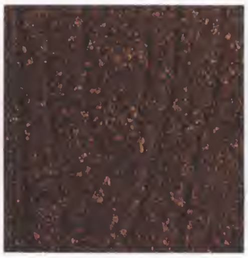

Woodland Brown—Textured

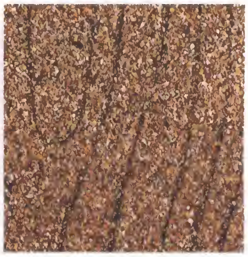
USG Dutch Lap Shingles

Satin White

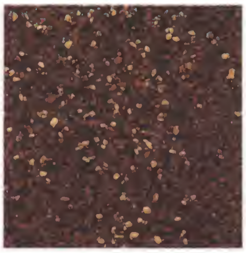

Rainier Green—Textured

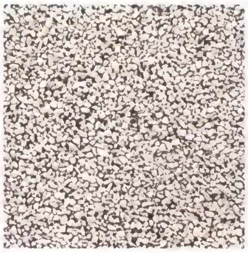

Desert Buff


Woodland Brown—Textured


Pastel Brown—Textured

FORTIFIED SEALCO Self-Sealing Shingles


Pebble Tan


Snow Cap

Slate Black

Also available in Fremont Brown

Note: Before making final color selection, see sample of actual material.

Asphalt Roll Roofing Products

MALABAR Accent Strips

Applied to every other tab of SEALCO Self-Sealing Shingles, only one bundle of accent strips is required to four bundles of self-sealing base shingles. Result is popular, rough rustic look simulating hand-cut cedar roofing.

Smooth surface. Accent strips vary in width. Colors: Slate Black, Woodland Brown, Pebble Tan. Twenty-year limited warranty and 5-year wind warranty.

Specifications:

Weight: approx. 75 lb. (34 kg) per bundle
Size: 12" x 36" (305 mm x 915 mm)
Exposure: 5" (127 mm); headlap 2" (51 mm)
Granules: Large
Coverage: 1⅓ square (133⅓ sq. ft.) (12.4 m²)

USG Starter Strips

Cut from ADAMANT Roll Roofing for use on valleys and eaves with asphalt shingle application. Optional where reversed shingles are used as starters. Mineral surface.

Specifications

9" (229 mm)

Size: 9" x 36' (229 mm x 10973 mm)
Weight: approx. 22 lb. (10 kg) per roll

18" (457 mm)

Size: 18" x 36' (457 mm x 10973 mm)
Weight: approx. 44 lb. (20 kg) per roll

Mineral Surface Roll Roofing

ADAMANT MARK I & MARK II Roll Roofing

A pliable roll roofing with ceramic granules in solid colors and blends. Use on inclined roof applications. Mineral surface. Underwriters Class C Label.

Specifications

Mark I

Weight: approx. 77 lb. (35 kg per roll)
Size: 36" x 32' (915 mm x 9754 mm)
Roll contains 96 sq. ft. (8.9 m²)

Mark II

Weight: approx. 90 lb. (41 kg) per roll
Size: 36" x 36' (915 mm x 10973 mm)
Roll contains 108 sq. ft. (10 m²)

SIL-O-ETT Split Roll Roofing

A pattern-edge roofing for re-covering work. Excellent wind resistance. Textured and smooth surfaces available in various colors.

Specifications

Weight: approx. 107 lb. (48 kg) per roll
Size: 36" x 42'8" (915 mm x 12954 mm)
Roll covers approx. 100 sq. ft. (9.29 m²) roof area (when applied with 2" (51 mm) headlap)
Underwriters Class C Label

Smooth Surface Roll Roofing

IMPERIAL Mark I Roll Roofing

A durable, smooth-surface roll roofing. Can be nailed on as a roof covering or mopped on with hot asphalt as a cap sheet in built-up roofing construction. Exposed surface can be painted with approved asphalt-base roof paint.

Specifications

Weight: approx. 50 lb. (23 kg) per roll
Size: 36″ x 36′ (915 mm x 10973 mm)
Roll contains 108 sq. ft. (10 m²)

USG Specification Roll Roofing

A hard, firm, coated and surfaced felt recommended for built-up roof construction. May be used as a base sheet or in multiple plies but must be protected from the elements by a cap sheet or other acceptable surfacing.

Specifications

Weight: approx. 80 lb. (36 kg) per roll
Size: 36″ x 72′ (915 mm x 21946 mm)
Roll contains 216 sq. ft. (20 m²)
Underwriters Type 15 Built-Up Roofing Label

Built-up Roofing Products

USG No. 15 Asphalt-Saturated Felt—plain or perforated

A smooth-laying, tough, asphalt-saturated felt, perforated or unperforated. Can be used as underlayment for asphalt shingles and for laminations in built-up roofs. Guide lines are on each side of sheet for 2-, 3-, 4-, and 5-ply construction.

Specifications

Plain or Perforated

45 lb. (20 kg)

Weight: approx. 45 lb. (20 kg) per roll
Size: 36″ x 108′ (915 mm x 32918 mm)
Roll contains: 324 sq. ft. (30 m²) (3 square)

60 lb. (27 kg)

Weight: approx. 60 lb. (27 kg) per roll
Size: 36″ x 144′ (915 mm x 43891 mm)
Roll contains: 432 sq. ft. (40 m²) (4 square)

USG No. 30 Asphalt-Saturated Felt

A smooth-laying, tough, asphalt-saturated felt. Can be used for laminations in built-up roofs and as underlayment for tile, slate, and wood shake (latter uses 18" x 120' size) roofing. Guide lines are on each side of sheet for 2-, 3-, 4-, and 5-ply construction.

Specifications

Saturated Felt

Weight: approx. 60 lb. (27 kg) per roll
Size: 36" x 72' (915 mm x 21946 mm)
Roll contains: 216 sq. ft. (20 m^2)

Shake Felt

Weight: approx. 50 lb. (23 kg) per roll
Size: 18" x 120' (457 mm x 36576 mm)
Roll contains: 180 sq. ft. (16.7 m^2)

FIRECODE Built-Up Roofing Products

FIRECODE Mark 72 Glass Cap Sheet

A high tensile strength, pliable, mineral-surfaced roll roofing material made from a glass, asphalt-coated base sheet with solid-colored ceramic granules. Used as cap sheet on inclined roof applications where a light-weight, fire-rated assembly* is desired

Specifications

Weight: approx. 72 lb. (33 kg) per roll
Size: 36" x 36' (915 mm x 10973 mm)
Roll contains approx. 108 sq. ft. (10 m^2)

*Label: AETL (Approved Engineering Testing Labs). For Class A and Class B fire classification, see U.S.G. specification data sheets f-c-6, 7.

FIRECODE Mark 14 & Mark 23 Base Sheets

These are special light-weight base sheets, pliable, mineral-fibered and asphalt-saturated. Used in built-up roofing assemblies requiring Class A* fire classification. Can be used over concrete, wood, gypsum and steel decks with insulation to obtain Class A ratings. Bondable for 15 or 20 years. Base sheets are used with Mark 72 glass cap sheet or gravel. (See separate U.S.G. specification data sheets f-c-7, 8, 9.)

*Fire classification AETL (Approved Engineering Testing Labs).

Specifications

FIRECODE Mark 14

Weight: approx. 70 lb. (32 kg) per roll
Size: 36" x 180' (915 mm x 54864 mm)
Roll contains approx. 540 sq. ft. (50 m^2)

FIRECODE Mark 23

Weight: approx. 70 lb. (32 kg) per roll
Size: 36" x 108' (915 mm x 32918 mm)
Roll contains approx. 324 sq. ft. (30 m^2)

TRADEMARKS: The following trademarks used herein are owned by United States Gypsum Company: USG, FORTIFIED, SEALCO, NOBILITY, MALABAR, ADAMANT, IMPERIAL, FIRECODE, SIL-O-ETT.

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